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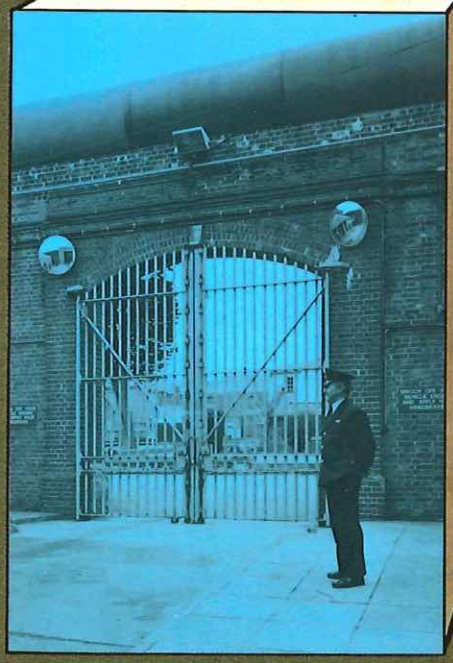

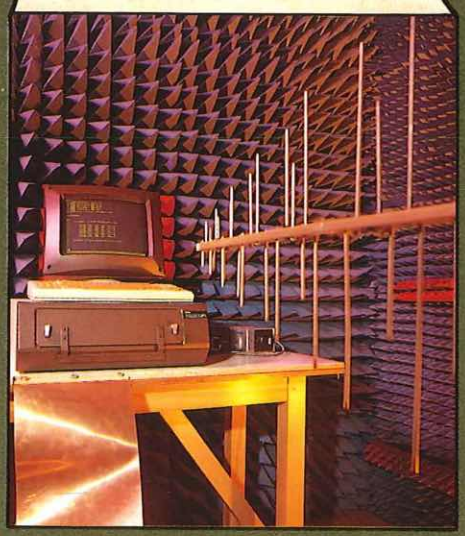

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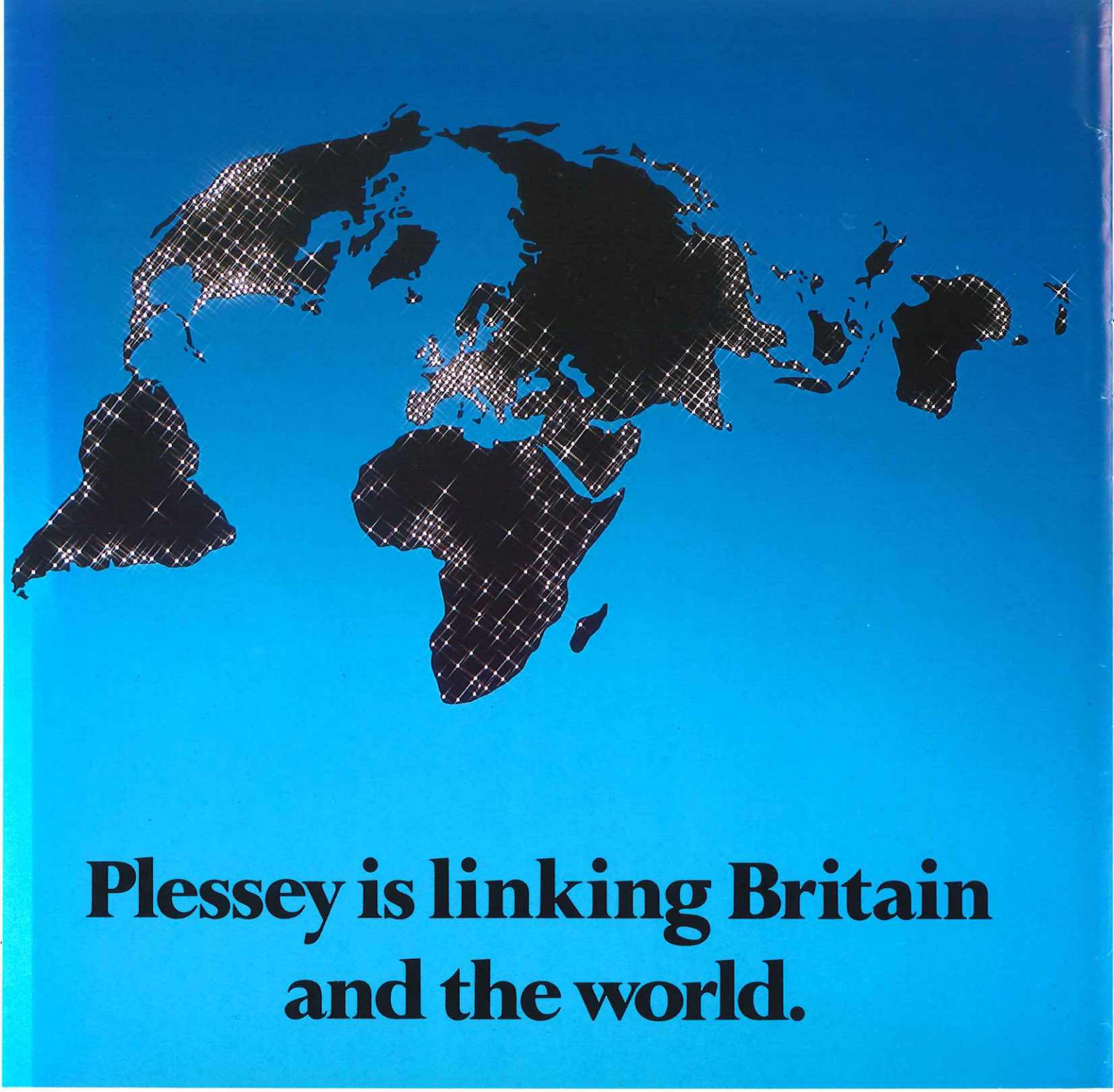

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A positive stance

As part of a major drive to improve its service to customers, British Telecom has published its first 'Quality of Service' report covering repairs, installation, operator services, public payphones and network reliability.

A series of similar reports is to be published every six months and, according to Mike Bett, Managing Director, UK Communications, the move reflects the company's determination to raise performance to meet customers' requirements and to demonstrate that it is doing so.

"The latest figures show that we are well on the way to recovering from the difficulties of earlier this year. We shall end this financial year in far better shape than when we started, and go on to a significantly improved service next year," said Mr Bett.

Mr Bett said that the quality of the company's service and commitment to its customers was clearly demonstrated in its reaction to the disastrous storms which swept southern England in October – see story headed 'Quality and the wind of change' in Newscene on page 69.

More than 1,000 additional staff worked round-the-clock to replace 1,200 miles of damaged cable and the storm affected not only the south and east but also those districts which lent staff to help out.

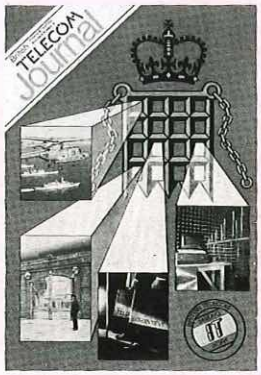
"We are determined to achieve our objectives. We are driving to improve quality by investment – investment in systems (CSS for example); investment in people (training for staff and managers); investment in equipment; and by applying a Total Quality approach.

"Quality is the key. Our objective must be to have a top quality network, a portfolio of quality products which increase the use of the network, a well-trained, well-paid, high-productivity workforce supported by the best systems ingenuity can devise and money can buy.

All of this must be geared to meet the needs of our customers," said Mr Bett.

British Telecom's decision to publish 'Quality of Service' reports represents a brave stance and few companies would dare to put forward such clear-cut promises about future improvements.

The move proves the company's willingness to be accountable for its shortcomings and to stand up and be counted for its achievements. ■



Cover: The portcullis, a symbol of Government and the logo used by H.M. Customs and Excise, sets the scene for British Telecom's involvement in Information Technology on a national scale. This special issue of the *British Telecom Journal* looks at the company's work with Whitehall and focuses on recent contracts with the Navy, the prison service, the Department of Health and Social Security, the Forestry Commission and local authorities. See extended feature starting on page 35. Cover design by Raygraphics.

In this issue

Cresting the airwaves
Broadcast Services in the news 7

Ringing the changes at Buckingham Palace
The Royal Family's new phone system 12

The call that amused Queen Victoria
Royal backing for the telephone pioneers 14

In touch with the future
Communications in the 1990's 18

All Ashore!
Transatlantic TAT 8 lands in Cornwall 22

War of words at the Geneva 'Convention'
Round-up of Telecom '87 26

All Change! Cashing in on computers
Robots add up the payphone coffers 28

Honestly the best policy
Special services for the insurance industry 32

British Telecom and Information Technology
Systems solutions — the way ahead 35

Battling to curb the information crisis 36

GAP in the marketplace 41

Streamlining the Social Security system 47

A prescription for healthy management 49

On course for customer training 50

Telexcellent! Still growing after 55 years
Telex is alive, kicking and expanding 54

Microwaving goodbye to cable links
Small antennaes are tops for business 58

Getting the message across . . . radiopaging goes transatlantic
Personal messages across the Atlantic 60

Remote computers cut costs by miles
Computer support for the digital network 64

Taking up the challenge
New man at the top 67

Newscene 69

Advertisers' index 82

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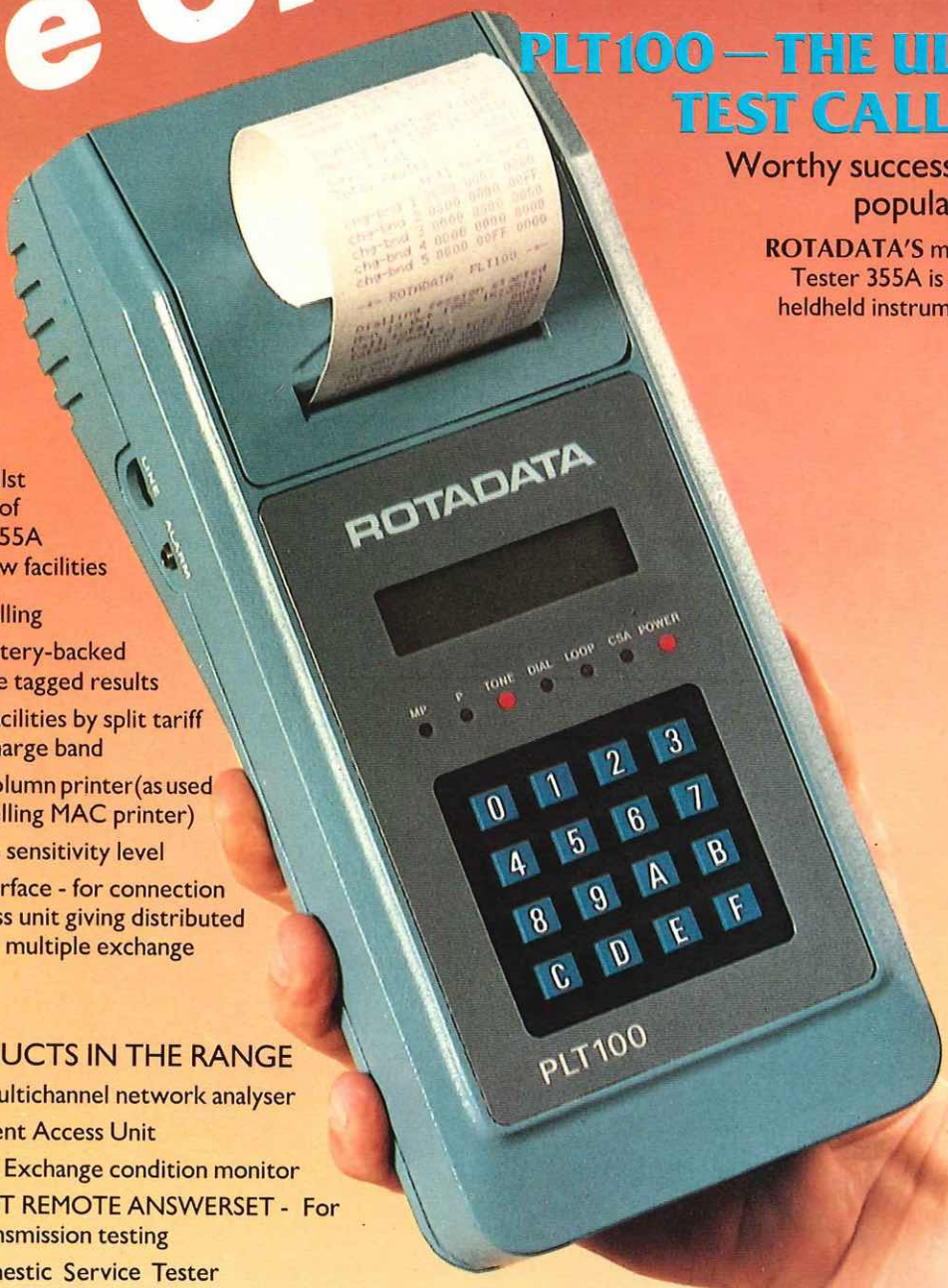

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British Telecom's Broadcast Services were invited to four parties this autumn – Labour, Liberal, SDP and Conservative. The unit provided programme quality sound circuit links to the party political conferences at Portsmouth, Brighton, Blackpool and Harrogate – and for the TUC, also at Blackpool. But such conferences are merely the tip of an iceberg and the unit's work can range from a Royal Wedding to a greyhound race, and from the summit of Snowdon to the skyscrapers of New York.

With the aid of the cable-free Manpack portable microwave radio-link, pictures can be transmitted from virtually anywhere – even a barge on the middle of the Thames.

Cresting the airwaves

Up to the minute microwave and satellite technology means major news events or sporting occasions can be transmitted to every home in Britain as they happen with a delay of mere milliseconds.

Without Broadcast Services, the country's radios would be silent, its TV screens blank, for apart from temporary circuits for one-off events, they have a permanent national network linking every broadcast studio in Britain.

As well as putting people in touch, Broadcast Services help the nation's gamblers with satellite racing, beaming major horse and greyhound meetings direct to local betting shops. And earlier this year, before the recent Stock Market crash, 'switched on' punters helped to add a record 103 pence to the Glaxo drugs group share price after the company chairman led a presentation in New York which was beamed to London and Edinburgh via a microwave link.

What is now termed Broadcast Services started life around 60 years ago providing sound links for radio. It then entered the field of vision with the advent of television and the 1953 coronation was the first major outside broadcast to be nationally televised, covered by 21 cameras and watched by 20 million viewers.

In 1937, a single mobile unit had covered the coronation of George VI. It operated three cameras near Hyde Park, and broadcast by a single transmitter with only a 60 mile range.

By 1986, Broadcast Services were able to provide hundreds of vital links for news crews as the eyes and ears of the world were focused on London for the wedding of Prince Andrew and Sarah Ferguson. ▷

THE BROADCASTING CONNECTION

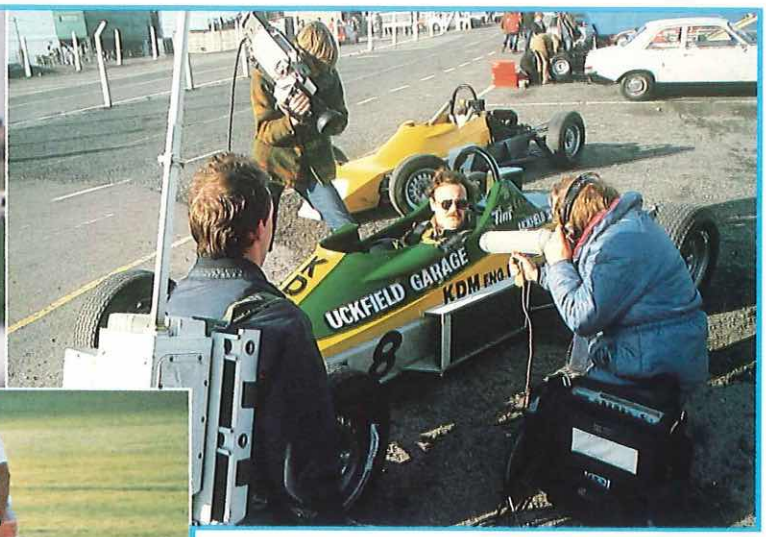
Sporting events throughout the country can be transmitted into people's homes as they happen, and horse-races not televised by the BBC or ITV are beamed to the nation's betting shops by satellite.

Five regional outside broadcast (OB) teams are based at London, Edinburgh, Cardiff, Manchester and Birmingham to provide all temporary network links lasting from half-an-hour to a month or longer, depending on the event. Often regions call for assistance from other teams, as was necessary for the Commonwealth Games in Edinburgh last year where a British Telecom communications complex co-ordinated coverage of different sports held simultaneously all over the city.

When a TV company intends to broadcast a particular event, they decide how they want to cover it, then when their planning has been finalised, they call in Broadcast Services to provide links from the event to their particular studio which in turn is already part of the permanent nationwide link to other regions.

The unit met a stiff logistics problem when asked to provide links for coverage of a ten mile race up and down Mount Snowdon for the Welsh channel S4C. Coverage used nine camera positions including four on the mountain itself, one mounted on a motorbike, and another in a helicopter. The motorbike, used in the early stages, sent pictures to the OB unit by microwave to the helicopter. The OB vehicle was in turn linked to the production company's OB scanner, and the programme was then sent live into the broadcast network to S4C in Cardiff. Because microwave transmissions have to be in line of sight to the receiver, the cameras on the mountains had to relay their pictures to another microwave transmitter/receiver which in turn relayed them to the OB unit.

In a recent 10 mile international race up and down Snowdon, the runners were followed by a camera mounted on a motorbike equipped with a Manpack microwave transmitter sending pictures back to British Telecom's outside broadcast unit by helicopter. Other microwave transmitters were installed on the mountain itself.



Left: the nerve centre of the broadcasting network is the control room of British Telecom Tower, London, with microwave links stretching throughout the country. It also handles programmes for screening abroad.

The complex operation involved 12 men for three days, providing a total of 17 microwave hops. And all for a cost to the customer of £11,751.

Flexible coverage of this and other sporting events is made possible by the portable and versatile Manpack. Originally developed for use at the Wimbledon tennis tournament, this cable-free portable microwave radio-link is carried on the operator's back, and connected to the camera by cable. A miniature aerial transmits sound and vision and the system offers total mobility, so that a three man crew - camera, microphone and Manpack operators - can wander around any event however crowded it might be.

Apart from one-off occasions, hundreds of vision and thousands of sound links are maintained 24 hours a day. These are normally leased to broadcasters, many for overseas news teams covering stories in Britain for worldwide transmission by the British Telecom Tower and British Telecom International. And in an average month, Broadcast Services handle almost 800 sound and over 800 vision temporary bookings.

Technological advances are constantly broadening the scope, complexity and physical capacity of the network, and recent developments in digital transmissions through fibre-optics - used for the first time in outside broadcasting at the Royal Wedding last year - promise to herald new standards in quality and sophistication. ■

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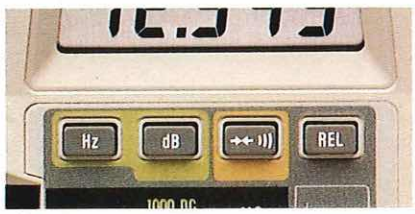

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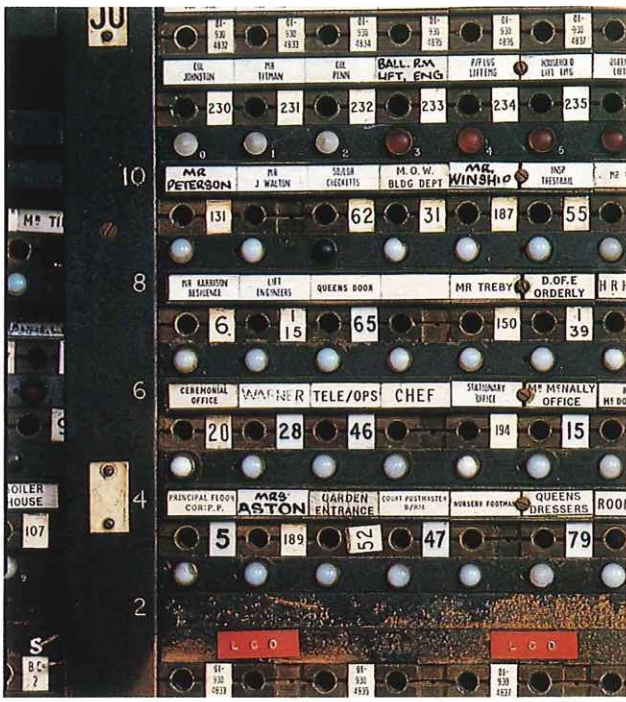
ROYAL CONNECTIONS

Ringing the changes

The Royal Family have always been conscious of the need to be in constant and immediate communication with each other and their government ever since the days of Queen Victoria. And although she started with just two telephones at Windsor Castle, it was the forging of a momentous link between Royalty and technology which has recently led to the installation of a state of the art PABX digital exchange at Buckingham Palace just over a century later.



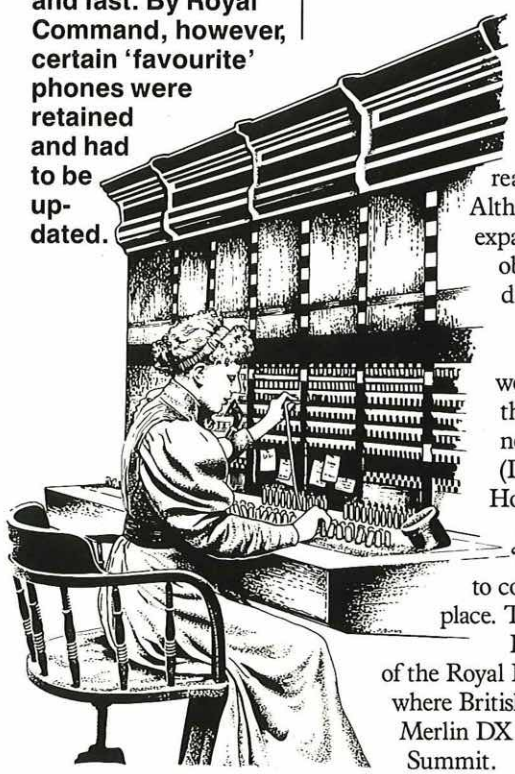
Below: artist's impression of the all-manual operator-controlled exchange which was replaced by an electro-mechanical version in the 1950's.

British Telecom has just completed a contract for its most exclusive customer – the Royal Family. Communications are playing an increasingly important role in the lives of today's busy, jet-setting Royals and the change-over to a new telephone system at Buckingham Palace had to be smooth and fast. By Royal Command, however, certain 'favourite' phones were retained and had to be up-dated.

The new telephone system at Buckingham Palace replaces an electro-mechanical Strowger exchange which was installed in the 1950's – itself replacing an all-manual operator-controlled branch exchange.

The Strowger exchange had a number of unusual features to support the special nature of the Palace switchboard and any replacement design had to meet several unusual needs which included:

- manual extensions used by the Royal Household to enable the operators to see who is calling and give the caller the appropriate response and priority;
- 'split-key' working, which prevented the operators from intruding on a conversation;
- a conference facility, known locally as the 'Jacob's Ladder'.



The pressure of replacement came from two main causes – the need for growth and the age of the old exchange. The capacity of the Strowger exchange (a PABX3) had reached its equipped limit. Although it is always possible to expand such an exchange, it is obsolete and parts are increasingly difficult to obtain.

Furthermore, the installation of a modern digital PABX would allow for future exploitation through the digital private network signalling system (DPNSS) which would enable the Household to link Royal residences with each other in a 'transparent' way and, if desired, to concentrate the operators in one place. The features of a new digital PABX were presented to officials of the Royal Household at Lancaster House, where British Telecom had installed its first Merlin DX for use at the World Economic Summit.

The Palace then engaged the Central Computer and Telecommunications Agency (CCTA) of HM Treasury to advise on the PABX Replacement Project and to procure the system. Following a long period of analysis and consideration a specification was drawn up and sent to selected PABX suppliers including BT.

The team from Westminster District, led by Mike Cook, the Field Sales Manager for Government, discussed the response with the former BT Enterprises Big Switch Support Group, headed at that time by Ted Rook. These discussions led to the selection of the Merlin DX from BT's portfolio, but as it stood the product did not meet the Palace's special needs.

The most significant related to the need for the operator to deal with a group of callers in strict priority and, at the same time, identify the status of the line. This was achieved by the use of dummy extensions whose only function would be to 'ring to lamp' on a panel specially designed to fit with the DX console. By using a translation in the DX, a user going 'off-hook' would generate a call to its lamp and the operator would pick up the call by keying a special code plus the extension number.

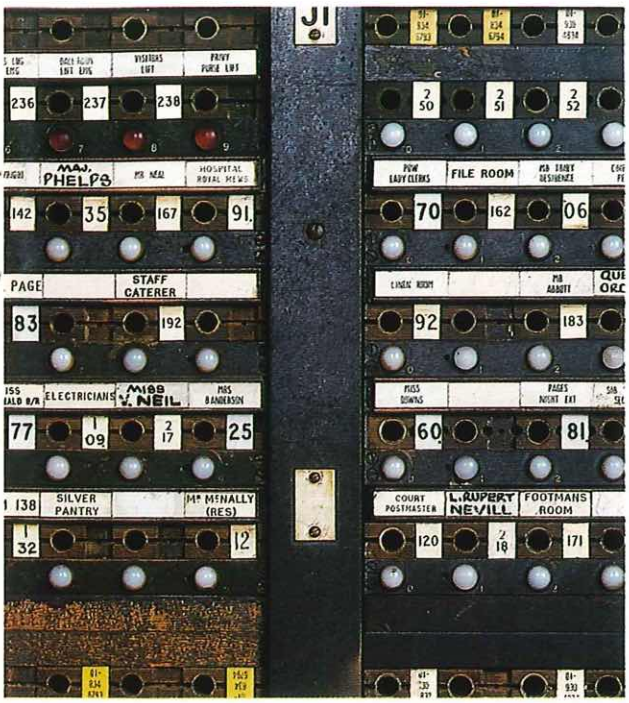
Split-key working was achieved by altering the controlling software. This was undertaken, together with a number of other changes, by the manufacturer, Plessey Networks and Office Systems Ltd.

The conference facility was to be met by the use of Confertel, a product supplied by BT subsidiary, Network Nine.

BT's response was sent off and the proposals demonstrated, to an ajudicating committee chaired by the Deputy Master of the Household, Lt Col Blair Stewart-Wilson. The committee backed the

at Buckingham Palace

Dave Prescott



proposals and work began in earnest to plan the detailed design, so that the manufacturers could start work on the modifications to - and manufacture of their elements of - the overall system.

Many hours were spent by Paul Brennen, the planning and implementation engineer, and Pat Sayers the customer training manager, watching the operators at work, recording the many different operations and defining these in the context of the Merlin DX.

The Queen

Having sorted these issues out, the next area of concern was the telephone instruments and subsidiary switching systems, particularly for members of the Royal Family. Some Royals insisted on keeping their old phones. The Queen, who, it is said, still refers to the Post Office as the GPO, is very fond of an old black Bakelite telephone which belonged to her father, King George VI and she is thought to resist using the new digital telephones. In some instances the old units were incompatible with the modern system and Andy Blake, the Marketing Account Executive, gave the necessary advice. To achieve a smooth changeover for the 'normal' telephones, work was started early on converting the 'old' telephones to plug and socket wiring and other wiring work where the new system was taking over the function of an old internal PAX.

One person who relished the idea of updating the Palace telephone network was Prince Philip. He is very gadget conscious, operates his own computer to keep in touch with palace, national and overseas affairs, and uses a Facility Phone 200, with hand free loudspeaker, 56 number storage, a basic calculator, alarm and timer to calculate cost of calls.

The security arrangements at the Palaces are very strict and all staff had to undergo special checks before they were allowed entry through specific entrances. Despite these difficulties, work progressed smoothly when the main PABX was delivered to site and BT Technical Officers Graham Nevill and Alan Robinson set about the internal checking, powering-up and testing of the DX.

Once the system was operational, BTS Ltd the sub-contractor for the Directory and Call Management System installed and tested their equipment and completed the interworking tests. Meanwhile, detailed plans were being laid for the telephone changeover and Installation Manager, Ian Richardson, decided that this was best tackled by nominating four team leaders who were familiar with the four building complexes: Buckingham Palace, Clarence House, St James' Palace and Kensington Palace.

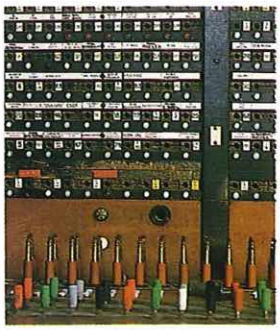
On the Friday afternoon of the changeover, all 24 staff of the Government Installation Office were gathered in the Cinema at Buckingham Palace and work began on those areas not in use at the time.

At 0900 the following day, the Deputy Master of the Household announced 'Gentlemen, you may begin' and the process of cutting off the old and connecting the new had begun. Ten minutes later it had all happened.

While this was happening, the operators in the old switchrooms were vacating their positions and moving into the temporary switchroom. There, under the eye of the Court Postmaster, and with the help of a BT training team, the operators took up the challenge of handling calls through the new system.

By noon, Project Manager Bill Tarr had decided that all had been successful and the task should proceed. The installation teams carried on with the changeover of more than 600 telephones, until mid-Sunday afternoon.

The final tidying-up operation followed two months later when the old switchroom had been cleared of its switchboard, fully redecorated and fitted with modern furniture. The consoles, screens and keyboards were then shifted to their permanent location. ■



Above: Buckingham Palace's electro-mechanical Strowger exchange which has just been replaced. Among the extensions which can be seen on the close-up (left) are ones to the nursery footman, silver pantry and the Queen's door.

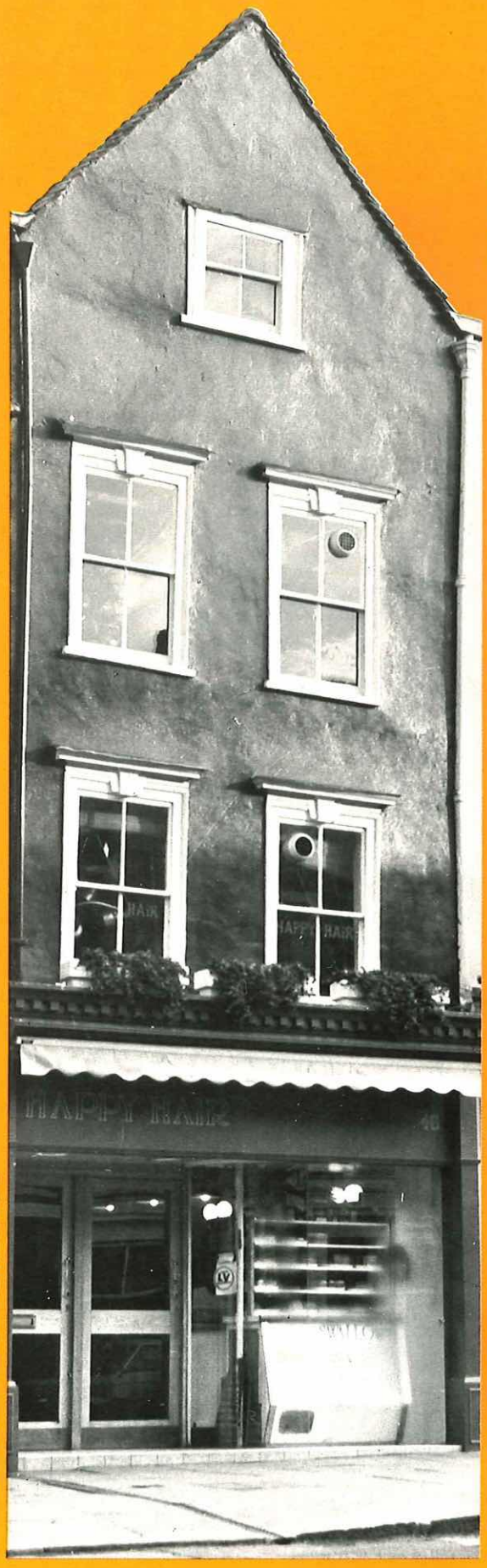
Below: Charlie Lockyer (right) who was in charge of the installation team stands outside Buckingham Palace with crew members Colin Dyball (left) and Barry Jolly (centre).

Mr D Prescott was Project Manager for the change-over at Buckingham Palace.

ROYAL CONNECTIONS

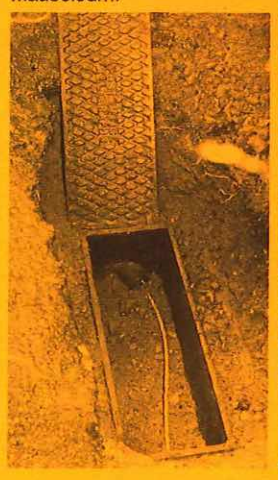
The call that amused

When Alexander Graham Bell gave Queen Victoria a personal demonstration of his new invention, one of the first sounds she heard down the telephone was a senior Post Office engineer humming the national anthem. The Queen was so impressed that she ordered one to be installed in her bedroom at Windsor Castle, a pioneering gesture which led to closer links between the monarch and ordinary people.



The telegraph rooms which served Windsor Castle during Victoria's reign are now a ladies' hairdressers. The Queen blocked the introduction of telephones at the Castle because they threatened the employment of her telegraph personnel.

The actual four-wire cable which was laid in 1883 linking Windsor Castle to Frogmore House and the Mausoleum.



One hundred years ago, A G Bell, recently married and with his young bride, set out for England to show Queen Victoria his brilliant invention.

But even before they landed, and despite world wide patents to protect his invention, copyists were already producing Bell's telephone. Indeed, detailed explanation, with sketches, had been published in the popular do-it-yourself magazines of the day, 'English Mechanic'.

Bell gave a demonstration of his telephone at Osborne House, on the Isle of Wight, speaking over a short distance to a cottage in the grounds. Later, after dinner, it was arranged for Her Majesty to listen on the telephone to a concert and organ recital from London.

The event was to start with the national anthem, but the party ran late and the musicians had disbanded. It was nearly midnight before the Queen was handed the receiver and eventually listened on the line. Rather than disappoint Her Majesty, Preece, a senior Post Office engineer, hummed the anthem into the transmitter. The Queen's comment was: "It is the national anthem, but it is badly played." The Queen noted the event and wrote, "It is rather faint and one must hold the tube close to one's ear."

The telephones were of the 'potato masher' design so named because they resembled a cooking utensil much used at that time.

Before the demonstration, Bell explained to the Queen that the instruments used were of the 'commercial variety', roughly made, and whittled out of pine wood.

But Bell had no need to feel embarrassed, for the keeper of the privy purse, Sir Thomas Biddulph, placed an order for which Bell promised to 'make a set of telephones expressly for their Majesty's use'. Bell must have been delighted, for he waived his customary demonstration fee of £50.

Certainly, Her Majesty was not disenchanted - she invited the Bells to Windsor, where the telephones she had ordered had been fitted at the Castle by the London firm Adams and Son of Marshall Street. A telephone was duly installed in the Queen's bedroom, the other in her equery's room.

The Queen's interest in the telephone may have been partly sparked off by popular rumours that the instrument could be used to contact Mars or reach the souls of the dead as Victoria herself dabbled in spiritualist circles. In fact in 1878 a company of soldiers of the Field Telegraph Battalion Royal Engineers spent two weeks constructing a route of telegraph poles along the Welsh coastline in an experiment to contact Mars. This was financed by the Gladstone government and research undertaken by the Telegraph Engineering Department of the British Post Office.

Meanwhile, the telephone market soon faced a boom which inevitably broke out into a cut price war. In the United Kingdom, the two largest

Queen Victoria

Queen Victoria photographed at around the same year as the first telephones were installed at Windsor Castle.

competitors, the Telephone Company Limited (Bell), and the Edison Telephone Company Limited, were locked in bitter rivalry. But both companies saw the wisdom of joining forces to beat off the competition and formed the United Telephone Company Limited (UTC).

One small firm which was rapidly climbing to success was the Sheffield firm Taskers Sons & Co who had a reputation for efficiency - and had managed to snatch a contract from UTC for telephones to be installed at Windsor and Balmoral.

According to the Lord Chamberlain's report of expenditure at Windsor Castle for 1882, there were three telephones in use for which the Castle was charged an annual rental of £22 each. The Queen considered this exhorbitant and ordered the removal of the Bell telephones, and the rentals ceased. Instead, six instruments were bought from Taskers, at eight pounds each. The United were furious.

Telecommunications at Windsor expanded at a fast pace. The telegraph had been at the Castle since 1854, linked to Buckingham Palace and Balmoral by telegraph wires running along railway lines and canals.

By 1883, Her Majesty had expressed a desire to have a telephone link from the Castle to Frogmore House, Windsor, once the home of her mother, the Duchess of Kent, now the occasional residence of her married children. This meant that when the Court was not in residence telephone communication could be made with her Majesty.

The Superintending Engineer of the Post Office Engineering Department, Southern Division, Basingstoke, issued instructions to the Royal Engineers, Field Telegraph Battalion in December 1883 to lay a two-inch diameter iron pipe, and four wire cable, from the Castle to Frogmore House, and the Mausoleum where Prince Albert was buried, a distance of 1,245 yards.

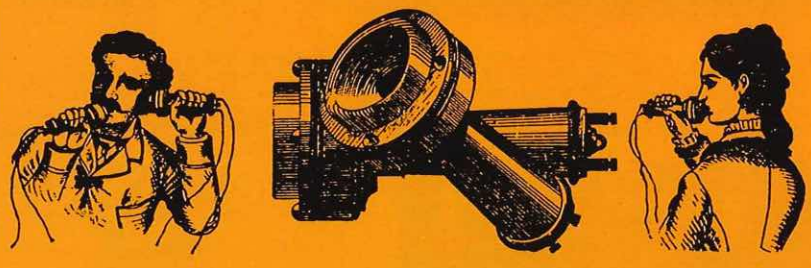
Bells patents had run out by the early 1890's, and the telecommunications business gained an international flavour as more European industries entered the market. Ironically at Windsor, the home of the Victorian Empire, the whole of its telephone network was foreign. The switchboards were Swedish, the telephones Belgian made, and the cables French.

A special cable made of lead and copper which had been imported from France from the Societe Industrielle des Telephones of Paris, and cleated around the granite walls of the Castle battlements was stolen within hours for its scrap value. It was later reported that the telephone minder had been dismissed for drunkeness. In the summer of 1896, Windsor Castle was connected direct by telephone to Buckingham Palace itself via Slough, Uxbridge and Piccadilly.

Redundancies weighed heavily with the Queen. Everywhere in the United Kingdom the telephone was replacing the obsolete telegraph. At Windsor she blocked more telephones which now threatened the employment of her telegraph personnel and also refused the offer for the Castle to be connected to the town's telephone exchange, so her messenger boys stayed.

Before the century drew to a close the Queen allowed herself a final luxury for her 80th birthday, the latest in telephone development - the Electrophone - a set of earphones held together by a steel band, over which live music was transmitted. The electrophones were switched on at the Castle in May 1899 to receive transmissions from the Covent Garden Opera House where a complete performance of Gounod's opera, Romeo and Juliet, was relayed to the Queen.

After her death in 1901, the Castle was connected to the national network, and the telephone number that had been held in reserve for nearly a decade was issued at last . . . Windsor 11. ■



Telephones of the kind installed at Windsor Castle were known as 'potato mashers' because they resembled a common cooking utensil.

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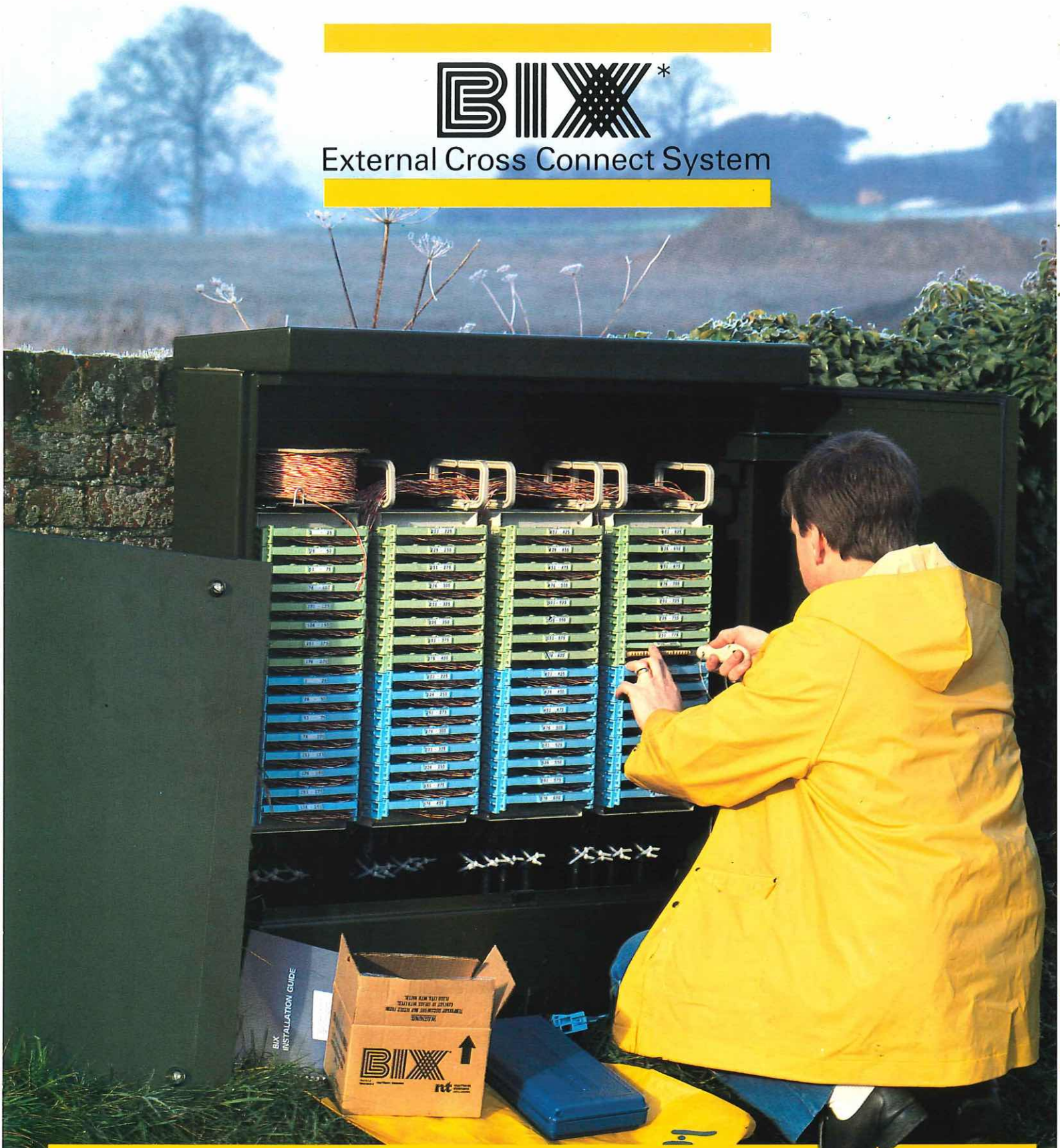

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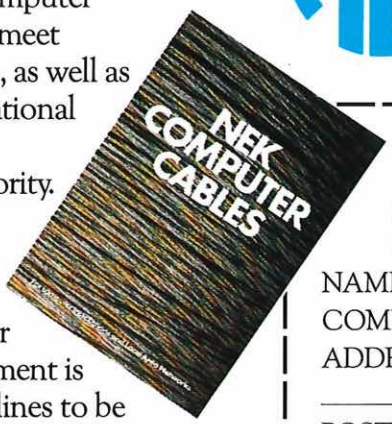

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In touch with the future

Robin Potter

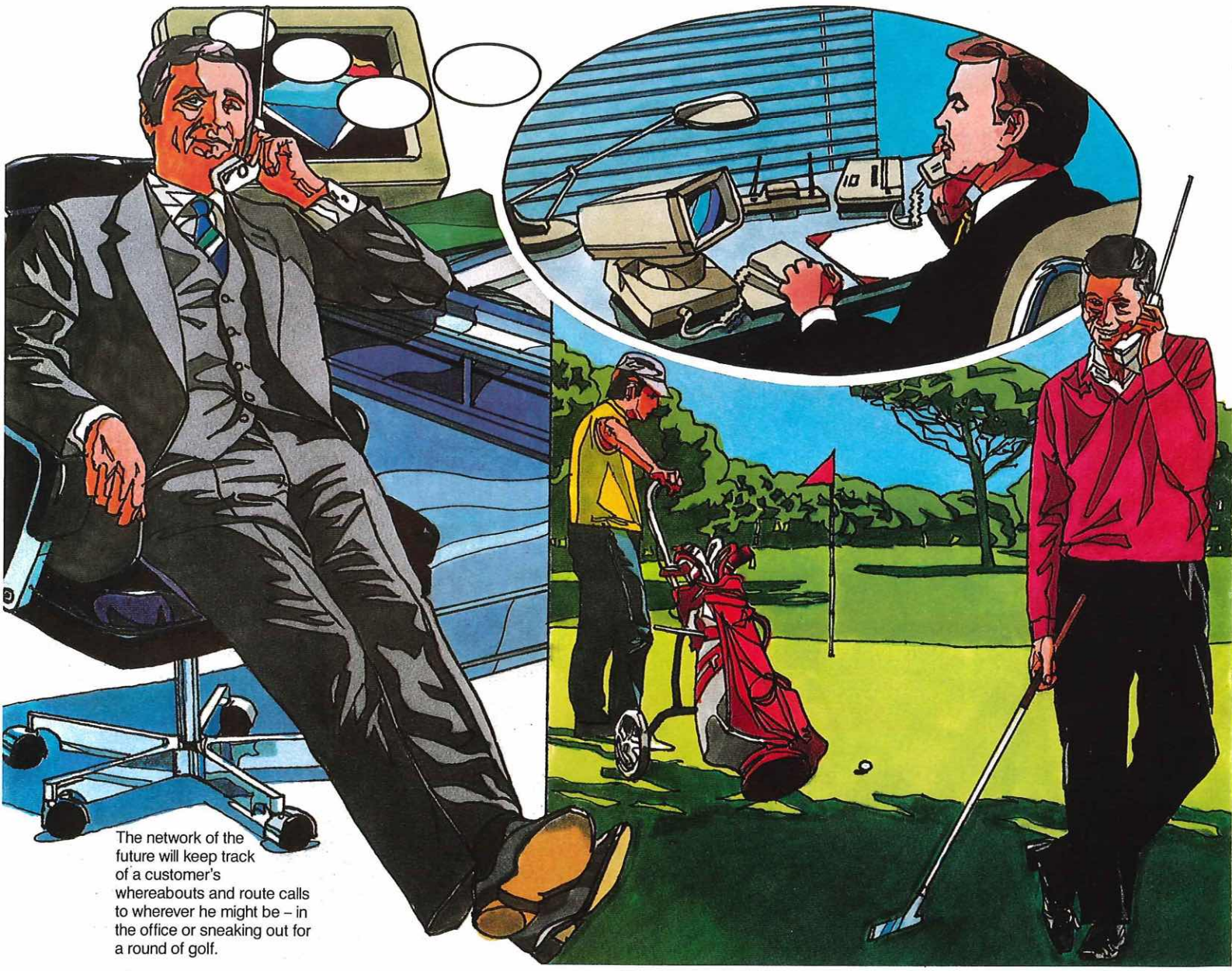
Developments in digital cellular radio were highlighted in the last issue of the *British Telecom Journal* and the concept of a future in which people can keep in touch wherever they are is rapidly becoming reality. This article looks at the major leaps forward likely to occur during the next decade.

Whilst at present probably less than one million people in the UK have regular access to a form of mobile communications, by the late 1990's this figure could have risen to more than five million. The cellular, private mobile, cordless, radiopaging and satellite based mobile networks that exist will offer a wider range of services than today with increasing overlap in their capabilities and services.

Research work is now directed at the natural development from the mobile networks of the 1990's towards the Universal Personal Communications Terminal (PCT). This pocket-sized unit would support both voice telephony and data messaging bothways and it is anticipated that options to have voice control of the PCT and spoken input/output of messages will be available.

The universal nature of the PCT comes from its ability to make calls from the home, the office or out in the world, possibly using different infrastructures as its initial radio access.

At home, either a home base station would look after all the PCTs belonging to both the household



The network of the future will keep track of a customer's whereabouts and route calls to wherever he might be – in the office or sneaking out for a round of golf.

Left: personal communications terminals of the future as envisaged by design students. The red one was designed by Mike Ellams of the Central School of Art and the yellow one by Ronald de Vlam of the Royal College of Art.

and their visitors, or alternatively a British Telecom provided 'microcell' coverage of the home and its immediate environs would provide the 'wireless' access. Outside, the PCT would be picked up by a national coverage infrastructure similar to the existing cellular network.

In town or suburban areas, the PCT's short range should not present coverage problems. But, in rural areas where the radio cells would be significantly larger, a power booster would be required to give full service coverage or, alternatively, message only reception would be possible. The location of base stations would be clearly marked so that outgoing service could be quickly obtained in such areas.

Where very high capacity is required then small radio 'microcells' of less than 200m radius would be implemented. In general these would be overlain with the wide area macrocells which would provide coverage across the whole area of a city. Finally, where coverage were provided by a private system such as an office 'wireless' exchange, the PCT would be picked up as soon as the customer entered the building.

Since the PCT is personal in nature, the network has to keep some track of the location of customers in order to route their calls and messages. While this raises certain social issues, in reality this is no more than the current cellular systems have to do but, in practice, with perhaps 20 million customers roaming around, the problem will be formidable.

Secure and effective billing and charging procedures will be necessary and with the varied infrastructure that could support the PCT service, additional issues are raised.

Perhaps the most interesting challenge to be faced in the future is the problem of routing calls to customers and the identities to be used. Callers will have to consider whether they want to call an individual at work or at home because the network will have the necessary intelligence to route the calls appropriately.

Such a network intelligence may not always achieve the expected result – a call to John Smith from a neighbour to tell him his dog is running down the road could interrupt him in business conference in another country! ■

Mr A R Potter is Head of the Mobile Systems Division at British Telecom's Martlesham Heath research laboratories.

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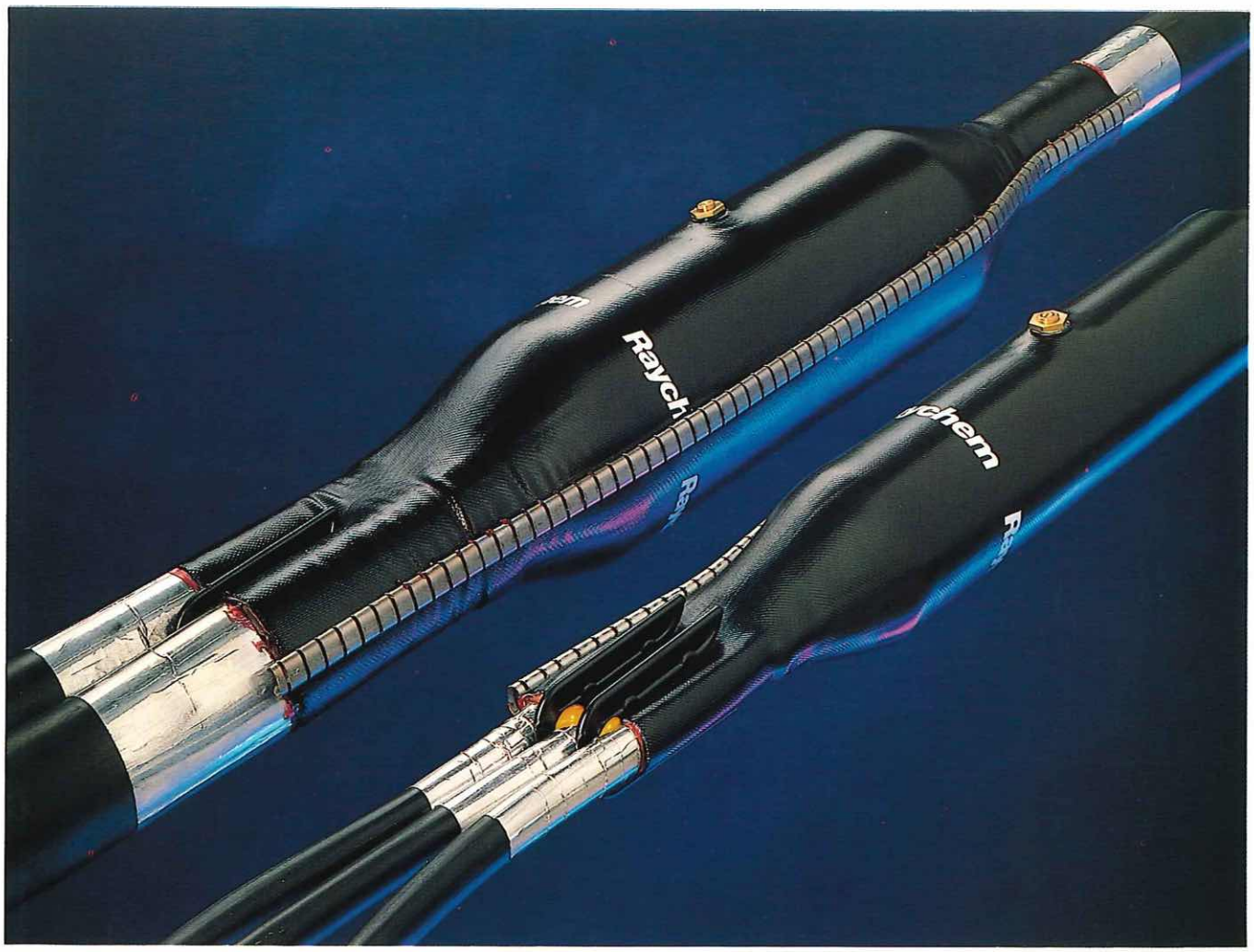

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All ashore!

After many years on the drawing board, the reality of transatlantic optical fibre communications has begun to take shape. The first vital link was forged in September when the UK end of the TAT 8 digital telecommunications cable was successfully brought ashore in Widemouth Bay, Cornwall.

Before the cable is brought ashore, locators are used to check the beach for obstructions or other working cables.

British Telecom International is now on course for the launch of TAT 8 international private digital services and the new cable is scheduled to be ready by July 1988. As reported in the last issue of the *British Telecom Journal*, the introduction of TAT 8 to the transatlantic network will mean more than just an improved telephone service between Britain and the United States. For the business user, the £220 million investment will reap a dramatic increase in communications capacity and capability.

The development of the TAT 8 system is important for two reasons: firstly, it will provide international telecommunications carriers such as BTI with much-needed extra circuit capacity to meet the growing demand for international communications; and secondly, it will enable the business communities of Europe and North America to compete more effectively with their foreign counterparts, using services designed with the sole aim of improving business efficiency.

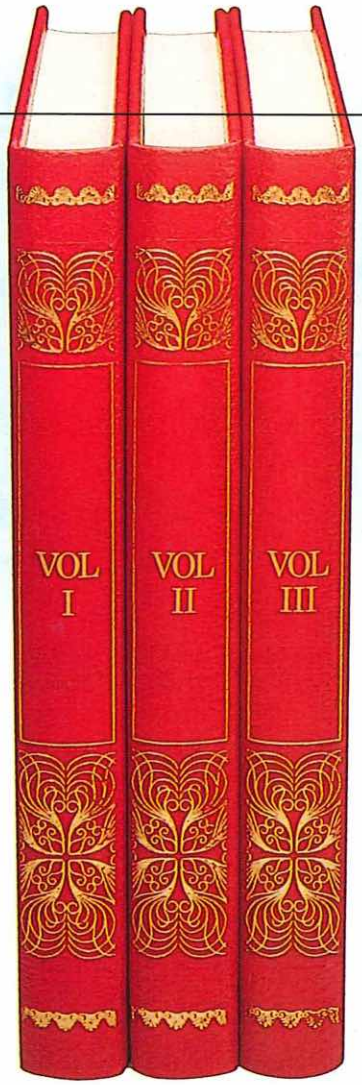
TAT 8 will allow every type of communication – speech, text, data, image – to be carried on a single, integrated digital path. This has been possible for a number of years through satellite-based transmission facilities, such as BTI's SatStream service. But even the high transmission standards associated with digital satellite services are not enough to meet the exacting demands of certain types of business communication and in these situations TAT 8 will provide fresh answers to this problem.

The cable, it is claimed, will be reliable both in terms of the system itself and in the services it offers. Vital components have been duplicated, increasing security of the system. The two optical fibre pairs in each segment of the cable have mutually independent repeaters, and automatic switching between fibres at each repeater will permit greater flexibility in the event of failure of a fibre. Repeaters also contain redundant components for added security.

The main danger to TAT 8 will come from the seabed activities of other industries, such as fishing. TAT 8 will be buried in coastal and continental shelf areas where this danger is greatest, but in the unlikely event of damage, restoration by equivalent digital satellite circuits will be provided. ■

The cable is floated in from the ship suspended on flotation bags which are cut off when it is in the right position, allowing the cable to sink where required. Then a trench is dug from the shore line to a manhole on the beach, and the cable buried.

CAN YOU WORK IT OUT?



CM

A bookworm has burrowed through three volumes of an encyclopaedia. Each volume has a cover that is a half centimetre thick and pages which, taken together, are three centimetres thick.

If the tunnel starts on the first page of volume one and ends on the last page of volume three, how long is it?

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WE CAN WORK IT OUT

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The answer is 5 cm. Remember, the first page is on the *right* of each volume, and the last page is on the *left*!

Below: British Telecom's impressive but restrained stand packed in the crowds.

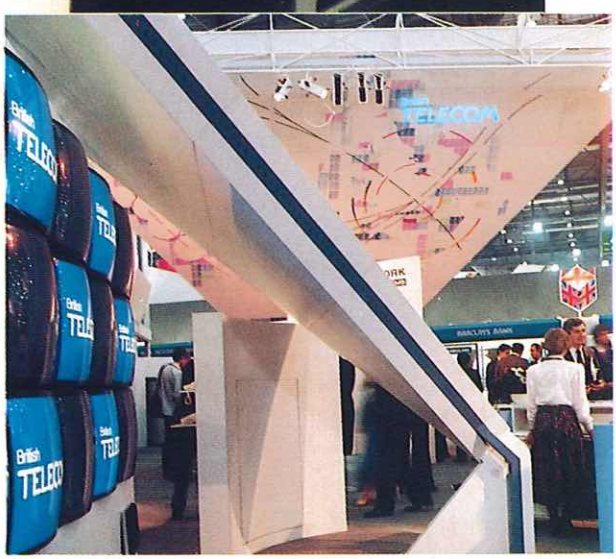
War of words at the Geneva 'Convention'

Designer steelwork and plastic tried to encapsulate the message of Telecom '87 – the world's largest telecommunications exhibition. But, when bulldozers finally swept the remains of the stands away, the universal need for people to communicate remained. A report by Editor, JUSTIN QUILLINAN.

"It's a small world, isn't it?" An overworked phrase which has become a cliche, but like all such statements remains in popular use because – to crib from Churchill, who invented more than his fair share – it conveys so much, to so many, with so few words.

The phrase reared its ugly head when a Canadian football fan sat next to a colleague of mine who was on his way to Telecom '87 – the four-yearly global telecommunications exhibition which took place in Geneva in October.

A conversation between the two men began in London's Gatwick airport when the Canadian volunteered that he had been visiting relatives in East Ham. Both men, it transpired, had been to the same school at the same time. A third man joined the 'old school' conversation and, strangely he knew the name of another colleague with whom he had shared a classroom in later years.



Bizarre coincidences perhaps. But the likelihood of linking four names so closely in an idle conversation in an airport lounge seems remote.

The 'small world' cliche is, no doubt, derived from many, many such encounters.

And the 'small world, one world, bridging the oceans and universal suffrage of the airwaves' concept was the main theme of the Telecom '87 exhibition at Palexpo. But chance encounters and the unpredictable human factor were conspicuous by their absence from the massive high-tech display in one of the cleanest and most orderly cities in the world.

The exhibition made much of Integrated Services Digital Networks (ISDN) with most countries claiming the only true example of the speech, text, data and picture medium.

At a time when technology seeks to confine the miracle of communication to anonymous grey boxes accessed by VDUs and keyboards, exhibitors went to extraordinary lengths to get their message across to the public.

Beautiful girls were much in evidence. So was rock music, stirring anthems, national costumes, food and wine, a Milky Way of strobe lights, free popcorn and tons of designer steelwork to support the 'one world' message.

IBM, for example, spent seven million dollars on their stand, a monolithic structure of chrome and plastic which quickly became known as the 'Star Ship Enterprise'.

AT & T's stand, which resembled a township within a city, made the news during exhibition week with a spectacular structural slippage – at a time when most of southern Britain was recovering from the October gales.

Presentations often occurred on adjacent stands at the same time and the resultant clash of voice and language tended to reduce the 'one world' message down to who's PA systems happened to be the loudest.

The British Telecom stand, with its cross-divisional and corporate theme, proved an effective crowd-puller and was refreshingly restrained and quietly tasteful in comparison to many of its competitors.

The individual products on display were highlighted in the last issue of the *British Telecom Journal* and there is no need to describe them again in this article.

The concept of unity was paramount, but it is fair to say that the speech translation device, pioneered by BTRL, Martlesham Heath, near Ipswich, attracted favourable comments from many quarters underlining the growing international need for language barriers to be broken down permanently, and with the utmost speed.

The stand was visited by the Duke of Kent and senior politicians. A top level stand team, augmented by chairman Mr Iain Vallance, handled enquiries from businessmen from all four corners of the globe and the world's technical and news media.

Prominent on the stand was the new generation of Information Technology equipment – known as Stanza – which brought together the capability in telecommunications, information technology and data processing of not just British Telecom, but also its subsidiary, the Mitel Corporation, and the Digital Equipment Company (DEC).

Stanza has been developed within British Telecom's International Products Division (IPD), which undertakes the design, development, manufacture and worldwide marketing of the company's own customer premises equipment and network products.

Alongside it was Mezza – the information management system – and the Integrated Trading System, a family of financial dealing room equipment.

Also represented at Geneva was the work of British Telecom's Overseas Division which was formed in 1985 and encompasses the former IAL organisation, with nearly 2,500 employees and 17 offices, subsidiaries or associate companies covering Africa, the Middle East and Far East.

International

The division offers expertise in a wide range of activities – consultancy; network design and construction; systems design, including the provision of total turnkey packages, and network operation and maintenance.

The third operating division represented was British Telecom International (BTI), responsible for satellite, cable and microwave links between the United Kingdom and the rest of the world. It also provides services to Britain's offshore oil industry and to ships at sea and will be extending this maritime service to aircraft in spring next year.

British Telecom's leading position in establishing an integrated services digital network (ISDN) was doubly underlined – firstly in assisting two other British companies, Plessey Major Systems and GEC Telecommunications, to demonstrate ISDN on their stands.

Secondly, through the publication of a multilingual brochure, the company announced its commitment with France Telecom, Deutsche Bundespost and SIP (the Italian administration) to the international development of ISDN. The four have been co-operating on joint studies of ISDN during the past few years.

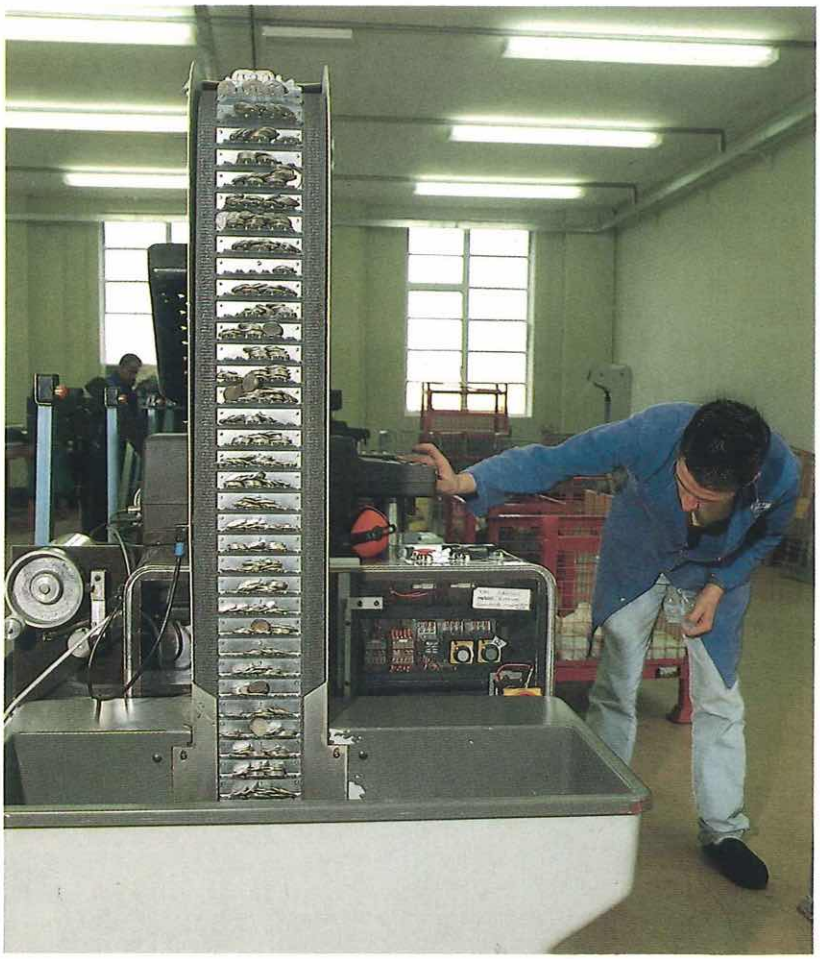
Elsewhere, the Inmarsat organisation brought high-flying technology down to earth with a flamboyant fun-air stand which featured, amongst other things, an Australian lorry driver – complete with cork-bedecked hat – who was able to keep in touch with his head office through a British Telecom radio pager thanks to the organisation's satellite links.

Among the more bizarre and eye-catching exhibits were British Aerospace with its project Hotol, a satellite-launching rival to the Space Shuttle and the Norwegian authority's transparent push-button telephone built by the EB Corporation.

The Toshiba stand featured a thumb-sized video camera for industrial use and Canon intrigued visitors with its still video system which could transmit pictures down telephone lines and modify them – even to the extent of changing the background behind the subject.

A plethora, then, of technical wizardry, But the body language involved in swerving around an unwelcome brochure vendor was still more subtle than the latest state-of-the-art translator device. And the human ability to communicate by sixth sense – like the man in the airport lounge – will probably always reign supreme. But technology, at least, will be able to help.

Below: the *British Telecom Journal* flew the flag at Geneva. Here, business manager John Klee (left) introduces the magazine to a new overseas subscriber.



All Change! Cashing in on computers

The king was in his counting house, counting out his money, the queen was in her parlour, eating bread and honey . . . That's how it was in Sing A Song of Sixpence. But the kings in British Telecom's west London Counting House are the computerised robots, ACCOST. A report by LIZ PROSSER.

Sixpences are certainly not among the average 10 tons of coins collected every day from London's 7,990 payphone boxes, dotted over 803 square miles from Watford to Croydon, and from Staines to Romford.

Collections are made once a day by yellow vans from phone boxes on street corners, in shopping centres, amusement arcades or motorway service areas; but often twice daily from the busiest boxes, like those at Euston and Waterloo mainline stations, or Heathrow Airport. During the summer tourist season the clink of coins in phone boxes usually doubles the takings.

These days when a phone coin box is 75 per cent full it emits a data signal warning, and quotes its number which is printed out on a computer at the payphone maintenance centre. Just as phone boxes in areas hit by vandalism can now send out an alarm signal, 'I've just lost my handset', 'I'm being vandalised' or 'I'm blocked' (when the slots are filled with chewing gum or more noxious substances).

The yellow vans, equipped with replacement containers, then take the boxes to one of the eight holding centres. Lorries deliver them daily to the Counting House near London's Chiswick flyover.

When British Telecom took over the function of collecting and counting payphone cash from the Post Office in 1982, the Counting House introduced a specialist counting system and new machinery - a system known as Operation AllChange.

But with as much as £92 to £100,000 worth of coins pouring into Counting House coffers daily - and £2½ million being banked every month - it was obvious a streamlined, speeded-up, more controlled system was needed to count and bag up the money for the banks.

So last year, with the help of American specialist consultants, a computerised cashing-up system, ACCOST (Automated Coin Counting System), was installed. Instead of the coins travelling along a conveyor belt in white plastic ice-cream cartons, they are fed directly down a computerised shoot and details of where the black boxes were collected, when, and the number of the kiosk instantly appears on the screen.

The entire operation of around 2,500 to 3,000 transactions (box counts) a day goes on behind the electrically controlled doors of a building with seemingly no entrance. Getting in is as difficult as entering Fort Knox, and seeing in from the outside through the solar screened windows, impossible!

The staff of 26 are scrutinised by cameras at every stage of their work and body screened before entering and leaving the most sensitive counting areas. All wear blue-grey pocketless overalls which must be kept buttoned at all times. They are not allowed to carry their own wallets or money while they work.

Visitors find one of the most interesting aspects of the Counting House is 'the museum'. This holds a collection of foreign coins from Spain to Zambia which have found their way into phone boxes.

There are also some very odd, indeed ingenious fake coins which have been used instead of legal currency . . . pieces of metal cut to the size of real

Opposite page: cash from London's phone boxes cascades down a computerised shoot at British Telecom's Counting House in Chiswick.

The colour of your money takes on a literal meaning at the Counting House where each denomination of coin is collected in a bag of a different hue.

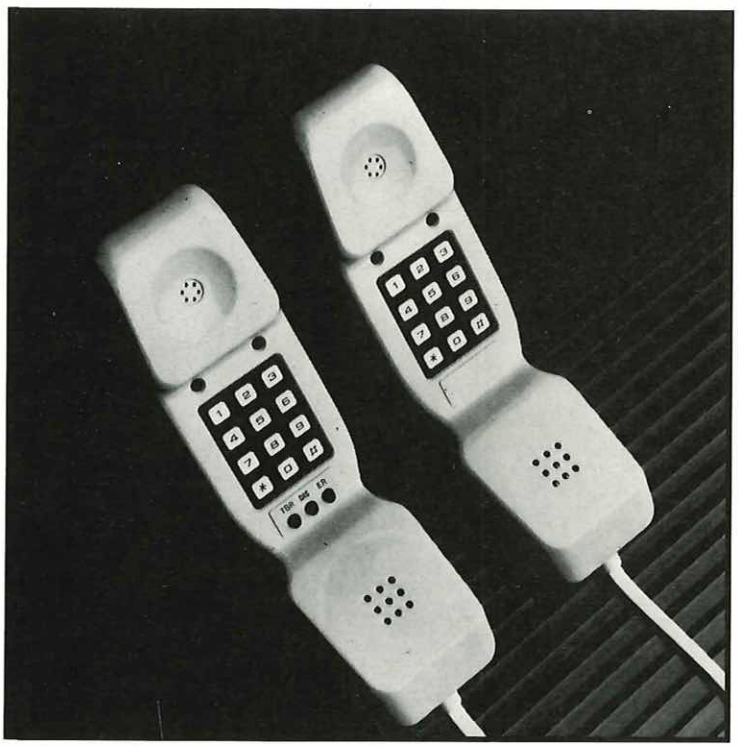
Bottom left: a computer is used to log details of each cash box collected from a phone booth.

coins – some even look genuine until you see the reverse side. And one cunning fellow obviously stole a metal tube from a nearby factory to forge coins. That particular kiosk has been changed to a cardphone box.

In fact, in 1986 and 1987 there's been a massive increase in the use of phonecards – introduced four years ago to help combat vandalism – and in certain areas phoning by credit card. But most people still prefer to place coins in the slot to make a phone call. Eventually, British Telecom expect cardphones and coin phoning to balance out 50-50.

So the red (£1), yellow (50p), blue (2p), green (20p) and white (silver) bags which have survived the switch from AllChange to ACCOST at the Counting House will continue to identify a very old tradition – our local or long distance calls from a public telephone box. ■

THE PROFESSIONAL'S CHOICE!



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- System X contains the world's most powerful telecommunications processor... 1 million BHCA measured.
- Not only that, System X has been providing a commercial ISDN service for longer than any other switch... since 1985.

And, when it comes to commercial success, System X's record reads like this:

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- 7 million local lines and 1.5 million trunks ordered.

And demand is growing daily...

In fact, last year more lines of System X were ordered than any other system in the world, outside of North America.

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With us, working together to lead the world isn't an idle boast... it's a recognition of achievement, a yardstick of success – and a statement of fact!

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WE'VE BEEN INSTALLING!

System X

Honestly the best policy

Dramatic changes in the insurance industry following recent government legislation have paved the way for a multi-million pound project involving British Telecom's Insurance Services (BTIS) offering a radically new kind of value added network service which could have great benefits for the customer.

BTIS has acquired exclusive rights to Interax, the most advanced insurance quotation-and-performance-monitoring service in Great Britain. Interax, which provides up to date details of the products of some 35 life insurance companies as well as information on over 100 motor insurers, comes to BT as the result of a business marriage between BTIS who were interested in acquiring a specialist insurance industry software development facility and Expert Information Systems (EIS), looking for a big-name company to give their Interax service financial credibility.

The insurance industry is changing dramatically under the impact of two recent Acts of Parliament, the Financial Services Act and the Building Societies Act, which will alter the way in which insurance is sold and will allow building societies to play a powerful role in the market.

Most life insurance products are purchased through financial intermediaries such as insurance brokers, or directly from the insurance companies acting through their 'tied agents'. Intermediaries usually work closely with a small number of different companies.

Sometimes, as in the case of very small operations, an intermediary may only be placing business with one or two insurance companies. Bigger intermediaries might work with larger panels of insurers, but under the previous legislation were free to place their insurance business with the insurance company offering the best agent commission, rather than best value to the customer.

Today, as a result of the Financial Services Act, all this is set to change. Intermediaries will have to make a clear choice – either to become representatives of a particular company or to go

Before the introduction of Interax, choosing insurance could be a confusing business for the customer, and there was always the risk of slipping up.

independent. If they elect the status of a company representative, they will have to make it clear to their customers that they are only selling the products of one insurance company and they will not be able to sell any other company's policies. If they go independent, they will have to obey a set of rules drawn up by a new regulatory body, an SRO (Self Regulatory Organisation), in consultation with SIB, the Securities and Investment Board.

These new rules will have a profound effect on the way independent intermediaries will operate in the future. They will have to be familiar with the life insurance products of all the insurance companies, not just a chosen few, and they will have to be able to demonstrate to the SRO that they have given the best advice appropriate to a particular customer's specific needs. That includes both knowing the customer's financial circumstances and surveying the whole market to find the right policy for him.

Under the new legislation building societies will be allowed to sell a wider range of insurance and investment. Most of the major societies are expected to go independent, and with their huge resources they will have an enormous competitive impact on the life insurance industry.

When BTIS launched its services in July 1986, its 'first generation' Value Added Network (VAN) was based firmly on classic Viewdata technology. Insurance quotations could be obtained on-line through a Prestel gateway from software run by the insurance companies themselves.

Specification

After 12 months experience with this basic technology, BTIS staff drew up the specification for their second generation service. The new service had to be capable of modification to suit major clients such as banks and building societies who wish to combine details of their own products with life insurance quotations in order to provide 'package deals' to their customers. It also had to cope with the extra demand for information generated by the Financial Services Act.

The existing service through the medium of Prestel gateway provides an electronic equivalent of the insurance company ratebook which has its own housestyle. To scan one or two such ratebooks to compare different companies' products is not difficult though it may be tedious.

But as the number of such 'electronic ratebooks' increases the comparison process becomes complex and very time-consuming. What is required is the electronic equivalent of a librarian to 'open the books at the right page' to ensure that comparative information is presented to the broker in a logical and meaningful manner.

The BTIS development team also wanted to break through the existing limitations of providing only screen-based advice, and to develop the necessary technology to provide network support to enable intermediaries to actually transact business through the network.

A development case was prepared and submitted for top level approval, based on the expanding of insurance product information to the intermediary.

EIS of Northern Ireland was founded by Michael McKeown, an insurance broker who was committed to the principle of providing his customers with 'Best Advice'. EIS developed a new kind of on-line quotation service called Interax which captured a customer's individual requirements and provided a list of insurance companies instead of simply obtaining one quote at a time. The list was ranked in order, not just by cost but also by projected bonuses and past performance as well.

Interax acts as an electronic librarian, ensuring that comparative information is presented to the broker so he can offer his customer the best advice.

For a time, Interax seemed too advanced for the market place. Though, without exception, financial intermediaries who saw the system were very impressed – and this included major banks and building societies – few were willing to commit themselves to a comparative system until the publication of the new rulebooks for intermediaries. Fewer still were prepared to tie themselves into an information service run by a small company without major financial backers.

So the stage was set for the project involving EIS and BTIS. A major programme of enhancements to the service is now under way, and as well as its unique comparison feature which will rank companies by any combination of premium, past performance and bonuses, many other developments are on the drawing board.

The service has already been sold to the Bank of Scotland and a number of major building societies who are anxious to have it customised to their own individual requirements. A vigorous sales programme is under way to attract the smaller independent intermediaries. With the date fast approaching when the new legislation will bite, they will need a comprehensive quotation service in order to satisfy the regulations — and perhaps to survive at all.

The business arrangement between BTIS and EIS has enormous potential. Arguably the most advanced on-line quotation and transaction support service in the market, Interax ideally complements the existing portfolio of BTIS services. ■

The Bank of Scotland and a number of major building societies, including the Alliance Leicester, have already bought the Interax system.

8655 companies have already discovered the benefits of electronic equipment rental, and the number grows daily.

The Benefits of Rental

The comparative cost of renting can reasonably be estimated at 10% of the purchase price per month for short-term periods of up to three months, falling to about 6% per month for a period of one year or more.
Very often rental is the easier and more convenient way to acquire electronic equipment, the financial arguments being only part of the story. There are numerous occasions when rental is the undisputed, if not the *only*, solution.
Remember, with rental you pay *only* while you use the equipment. With ownership you pay *all* the time.

When renting you incur:

* No maintenance or repair costs
* No interest charges
* No calibration downtime
* No provision for replacement

And you can have the equipment:

* Returned the moment you finish with it
* Replaced if it becomes faulty without any cost
* Changed if it becomes obsolete or technically unsuitable
* Returned during your works closure

In addition you can:

* More easily allocate costs to projects, production programmes or plants since they are fixed and known precisely in advance
* Optimise taxation

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* **Peak Demand**
When you have a peak load or major re-calibration problem and you need temporarily to augment your own equipment — RENT.
* **Panic need**
When you have an emergency situation, a crash project or a plant/equipment failure — RENT.
* **Defined Short-term need**
When you require something special for a specific short-term project, contract or assignment — RENT.
* **Low utilisation**
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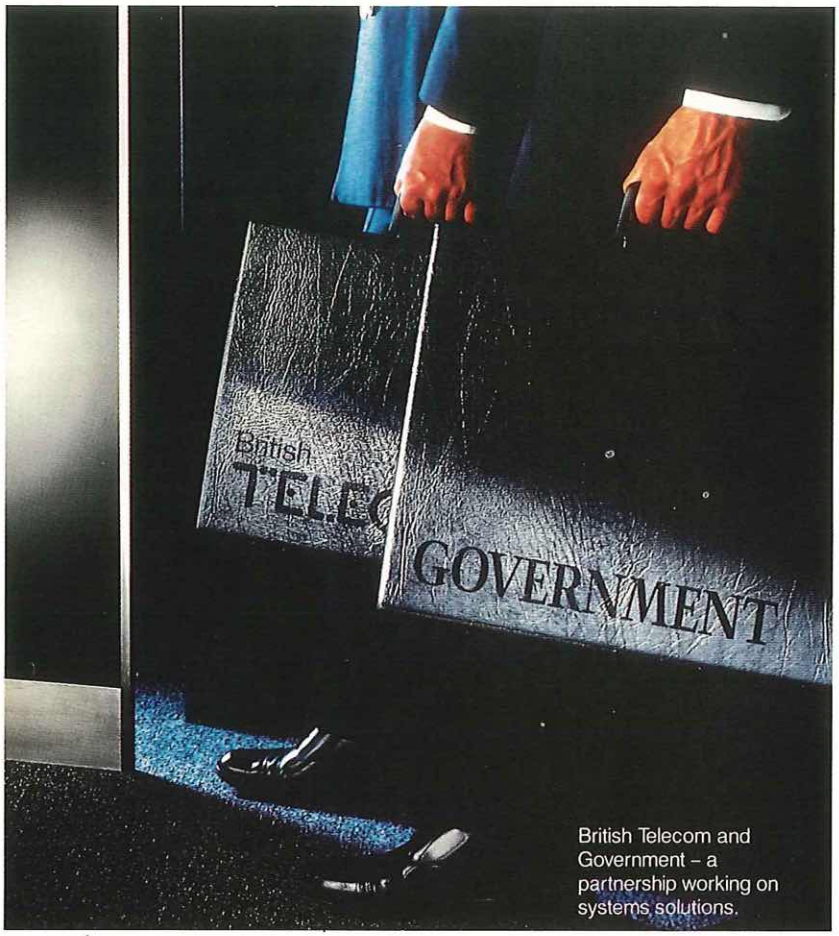
Systems solutions – the way ahead



British Telecom and Government – a partnership working on systems solutions.

Most people are aware of the immense range of communications 'kit' available these days. But individual pieces of equipment, however sophisticated, are unlikely to solve the complex demands of large customers whether they be in the military or 'civvy street' or engaged in activities ranging from Whitehall to the management of rural woodlands.

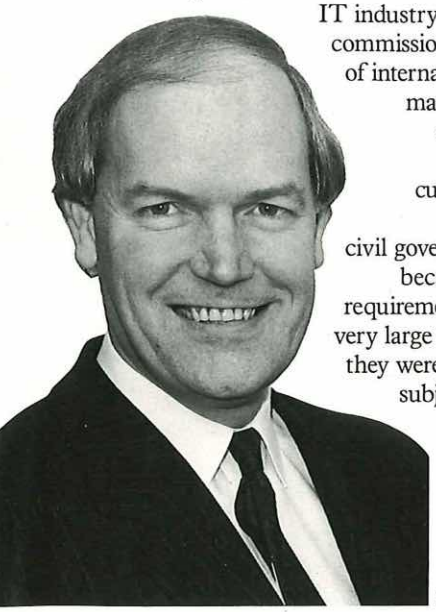
The concept of Information Technology (IT) – the convergence of computing, office systems and telecommunications – gives a 'package deal' solution to problems which can encompass different professional disciplines.

British Telecom, already a veteran in the IT field, is now going one step further into 'systems thinking' to solve the communications problems faced by customers in both military and civil markets in today's world.

BT's Government National Accounts has evolved over the last couple of years to handle big projects in both sectors.

Harvey Parr, aged 43, is the general manager of the 200-strong Government Sector and in this exclusive interview with the *British Telecom Journal* he explains his team's approach to an IT market now worth about £1 billion a year.

"We quickly realised the importance of understanding what customers wanted to buy from IT industry suppliers and commissioned a number of internal and external market studies to define specific market and customer needs. We started in civil government and it became clear that requirements were on a very large scale and that they were complex and subject to change. It was also necessary for 'solutions' to meet the departmental needs rather than stopping at the supply of telecommunications circuits or computing boxes. The research also showed that BT with its strong networking capability, commitments to standards and a large user of network systems could make a major contribution to meeting the needs of both local and national government.


Left: Harvey Parr, general manager of BT's Government Sector.

Much of what BT does is to systems integrate the components from other suppliers in a network and deliver the service. Being large and financially stable, the company is quite capable of meeting the needs of customers on the scale required by government departments.

Studies found that although BT was technically strong and had a national infrastructure for service it was, however, insufficiently versed in 'systems thinking' to contribute in meeting the business needs of users with effective solutions.

It also emerged that large customers wished to exchange views on their strategic requirements and to talk about BT's ability as a supplier to meet those needs over the next three to five years.

As a result, the company recognised that it must be customer and market led rather than a composite of product, practice and technology drives.

Government Sector's market strategy now embraces the findings of the research and covers research and development, international products, the specialist Government and Advanced Projects group (see separate article on page 41), BT Applied Technology (the internal systems house) and also incorporates the views of customer marketing departments. The process is managed to communicate requirements throughout the whole of the company. ▷

Market studies have been undertaken and completed in defence, local authorities, health, police and education to complement earlier work in civil government. They have shown that customers need networked solutions through systems integration and value added data services. Ultimately, they also need full facility-managed services for both networks and business operations.

Collaboration will be the key for the future and the company proposes to work with systems and software houses, hardware suppliers, information providers and management consultants to meet the diverse requirements of the market place.

Current work with Computer Sciences, Systems Designers, Logica, ICL, ITL, DEC, Honeywell, Nixdorf and others, already indicates that BT could have an important role in forging a 'systems industry partnership'.

But the Government and public sector marketplace in the UK should not be viewed in isolation because it is part of Europe which has its own purchasing standards. Requirements for network systems and solutions are emerging across Europe and there will be considerable scope for collaboration with European companies in the future. We must also look at the international scene.

Defence customers also require solutions across the NATO community and the expertise and experience gained in the UK markets could be exploited, with international economies of scale to keep costs down.

A major development for BT would be for the company to harmonise with the systems industry, especially in the government markets. As BT develops and markets on a worldwide basis it could provide the international exporting capability for IT companies in the UK.

British Telecom is changing its direction from being a telecommunications company to becoming an IT company offering comprehensive systems solutions. It is re-focusing its vast wealth of talent and experience to meet the challenge of satisfying real customer requirements. ”

A large and growing number of public bodies are searching for a solution to an information crisis. Ports, tax offices, universities, prisons and even woodlands depend on the efficient use of information to enable them to be managed effectively. This article looks at some of the Information Technology problems being solved by British Telecom in the civil sector.

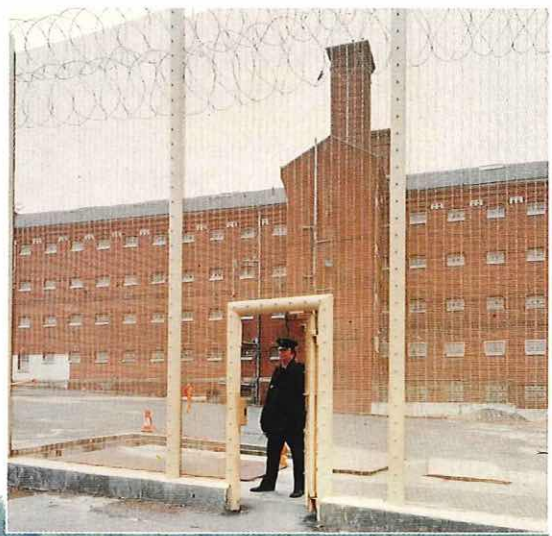
Battling to curb the information crisis

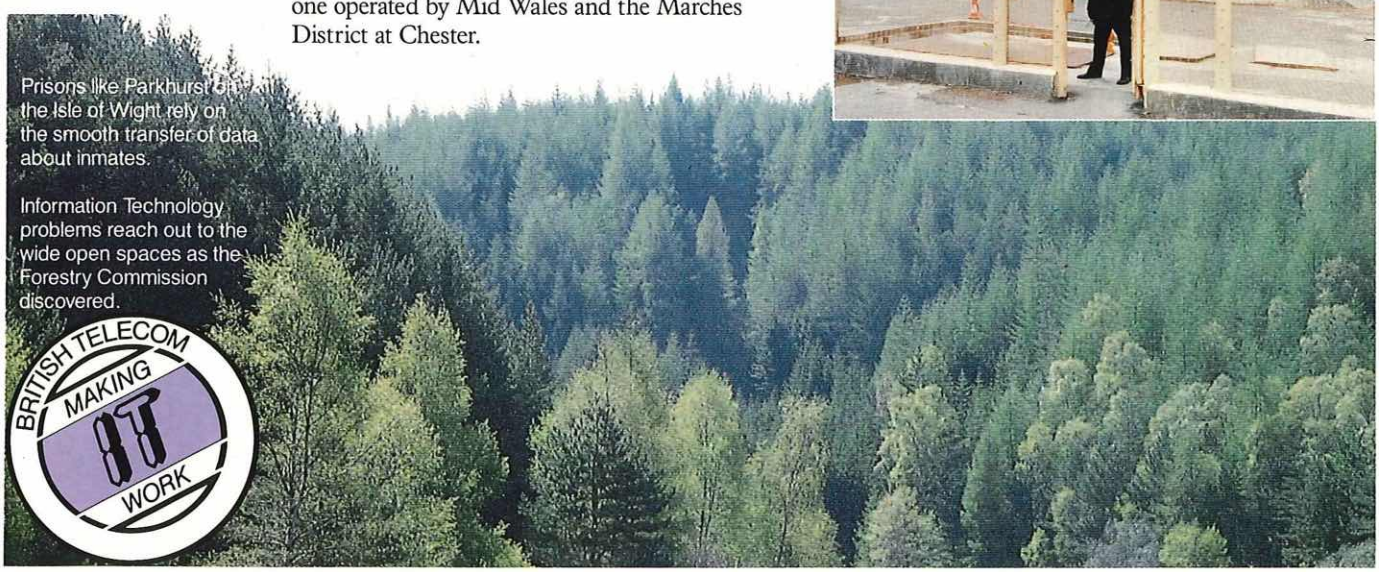
The Inland Revenue is one of British Telecom's major IT customers and represents the company's third largest civil government account covering 2,000 offices throughout the UK as well as 11 major computing centres.

A special data network consisting of KiloStream and MultiStream links to all major processing centres and many smaller offices handles the computerisation of P.A.Y.E. and its schedules.

After three years work, the £20 million project has just been completed on time.

Inland Revenue was the first government client to go into a new British Telecom Service Centre – the one operated by Mid Wales and the Marches District at Chester.





Prisons like Parkhurst on the Isle of Wight rely on the smooth transfer of data about inmates.

Information Technology problems reach out to the wide open spaces as the Forestry Commission discovered.

BRITISH TELECOM MAKING IT WORK

The move was a pioneering one for the role of Service Centres throughout the country and take-up by both sides has been successful. Future IT projects include office automation at Inland Revenue buildings throughout the country.

Notable successes in large systems over the last two years include the **Forestry Commission** and the **Prison Service**. The two contracts demonstrate IT flexibility in that one is based on a large central computer and the other on distributed personal computers.

The **Forestry Commission** contract is an integrated solution drawing on equipment from outside suppliers as well as standard British Telecom products to provide a unique system.

Its hub is a DEC VAX 8600, with about 140 Merlin M4000 personal computers accessing the VAX from sites all over Britain through a specially designed private data network. The contract was won in the early part of last year against stiff competition from DEC.

The **Prison Service** contract shows the other side of the IT coin and uses a large number of small computers which could be linked into an existing ICL mainframe.

The contract was won on the strengths of the Merlin M5000 range of IBM-compatible personal computers. Special software was developed by British Telecom's Government and Advanced Projects to allow files to be transferred to and from the ICL mainframe through a bank of networked M5000 computers in Liverpool, which call up other M5000's in the prisons and automatically transfer files.

Work is also currently being done within the group to identify and design answers to meet the special needs of police forces.

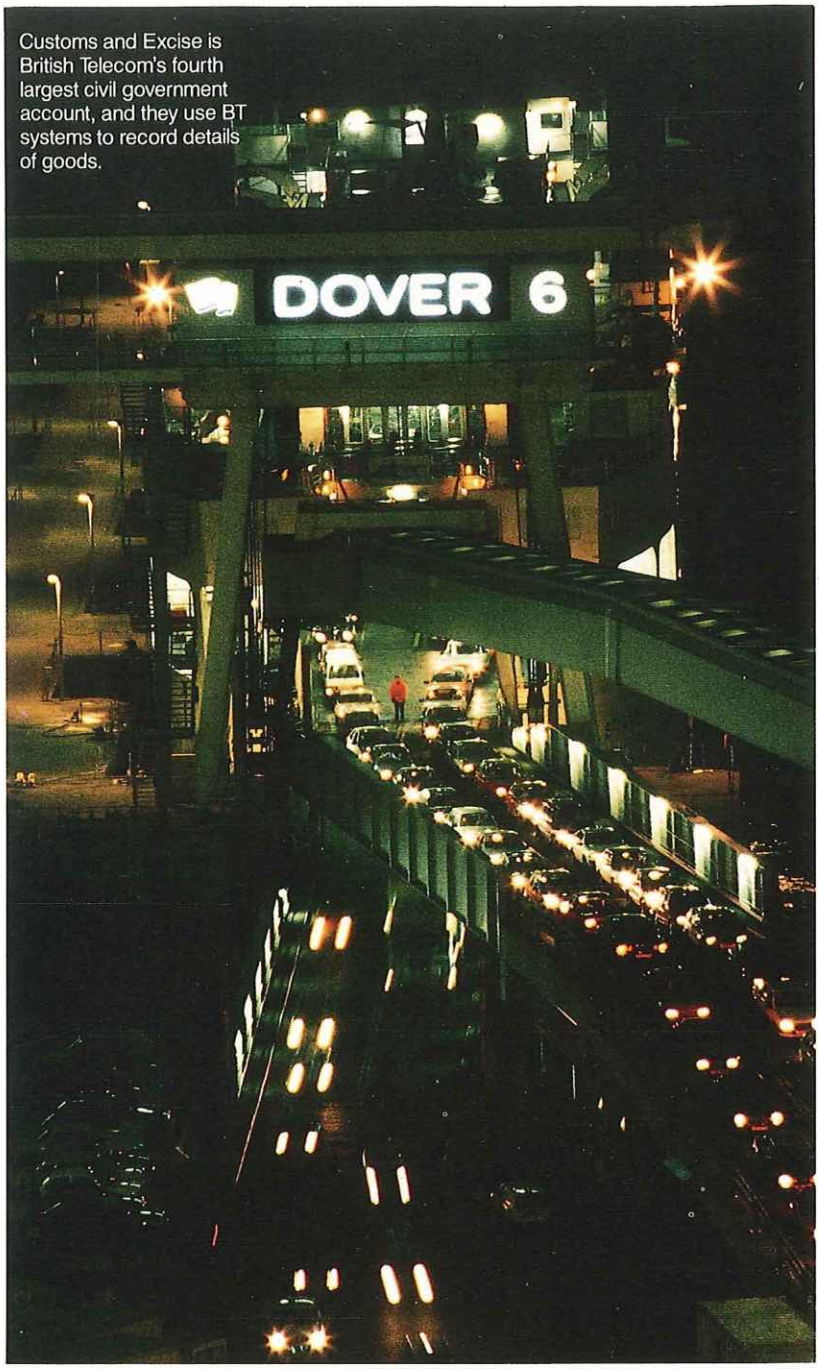
Universities have been a major IT player for a long time, often pioneering IT technology, systems and ideas before the rest of the UK.

The university data network, the largest of its kind in the UK, has been going for 10 years and continues to grow and expand. It links together every UK university and many polytechnics with Government research laboratories to allow academics, engineers and scientists to pass data to ▷

HM Customs and Excise now use British Telecom systems to monitor goods entering British ports.

Princess Anne pictured opening the London University Livenet network.

BRITISH TELECOM MAKING IT WORK



Customs and Excise is British Telecom's fourth largest civil government account, and they use BT systems to record details of goods.

one another through the local computing centres at their own colleges.

British Telecom is also talking to the Open University about satellite links to allow it to pass programmes throughout the world.

London University's Livenet network, which links all London universities and colleges to allow interactive video between students and lecturers is a major teaching advance and resulted from a collaborative venture between British Telecom and London University.

The network could be viewed as a Local Area Videonet linking with BT's own wide area digital networks and there are good prospects for selling the product to other universities at home and abroad and to large industrial users.

Customs and Excise is British Telecom's fourth largest civil government account and a long term partner with the company having used the facilities of British Telecom Applied Technology (BTAT) for many years.

BT manages a number of computer centres to provide computing power with tailor-made software and applications programs to run and manage Customs and Excise. One particular success was a system which allows goods to enter British ports and their details to be recorded on a customs computer centre.

The company operates a UK-wide network allowing access to Customs and Excise computers by traders, importers and exporters.

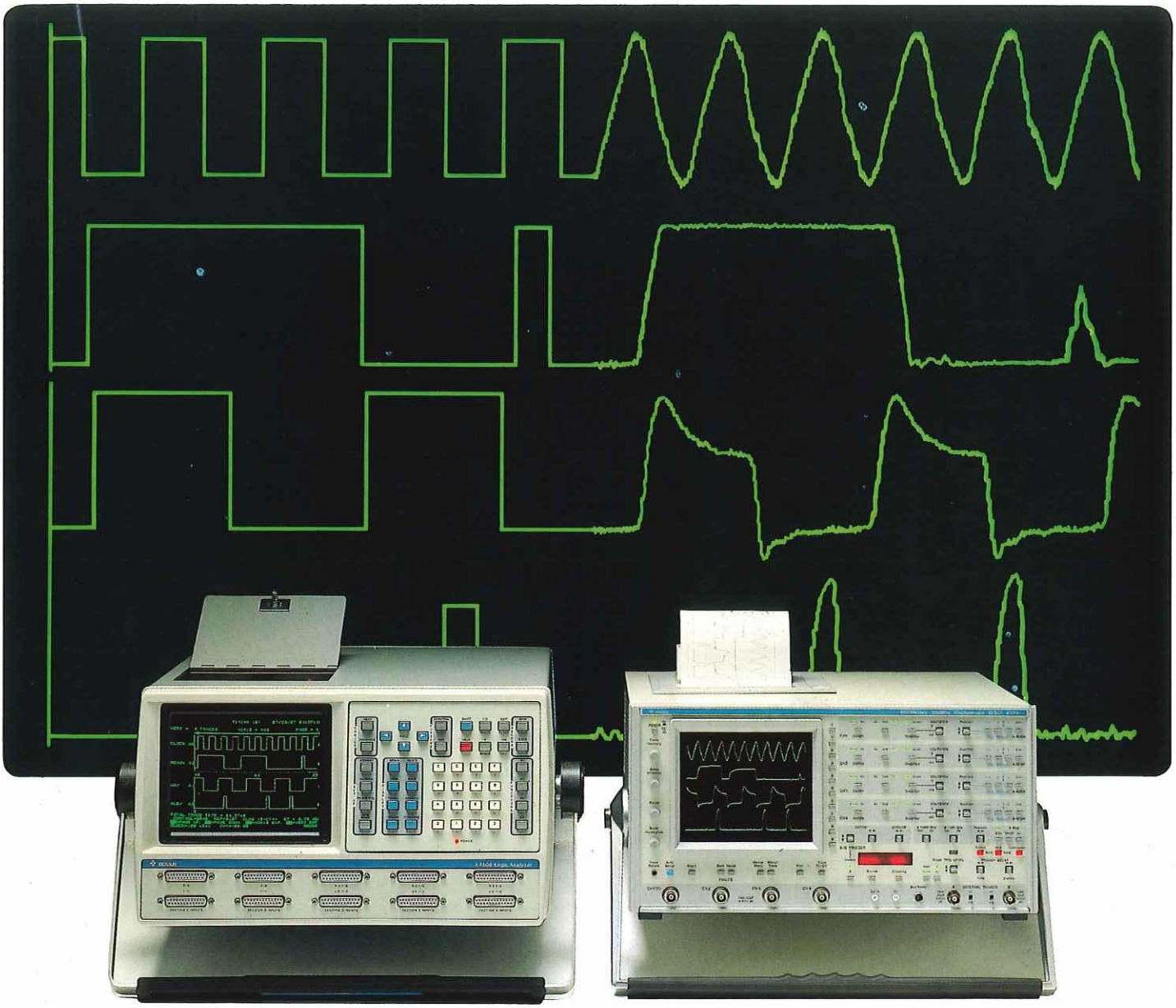
The first contract has been worth £20 million over the last three years.

Future prospects hinge upon an EEC decision to work towards 'customs union' and the harmonisation of tariffs throughout Europe.

This could involve BT in a European customs and trader network and the company believes that it is in a position to lead the way. ■

Chester Service Centre's maintenance unit – its first Government customer was the Inland Revenue.

BRITISH TELECOM MAKING IT WORK



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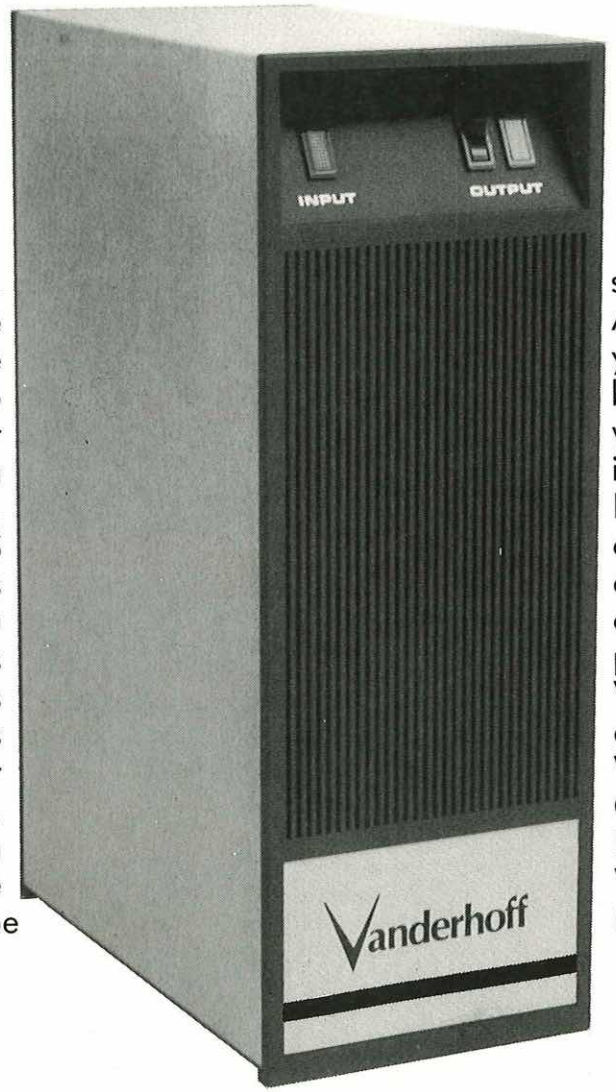

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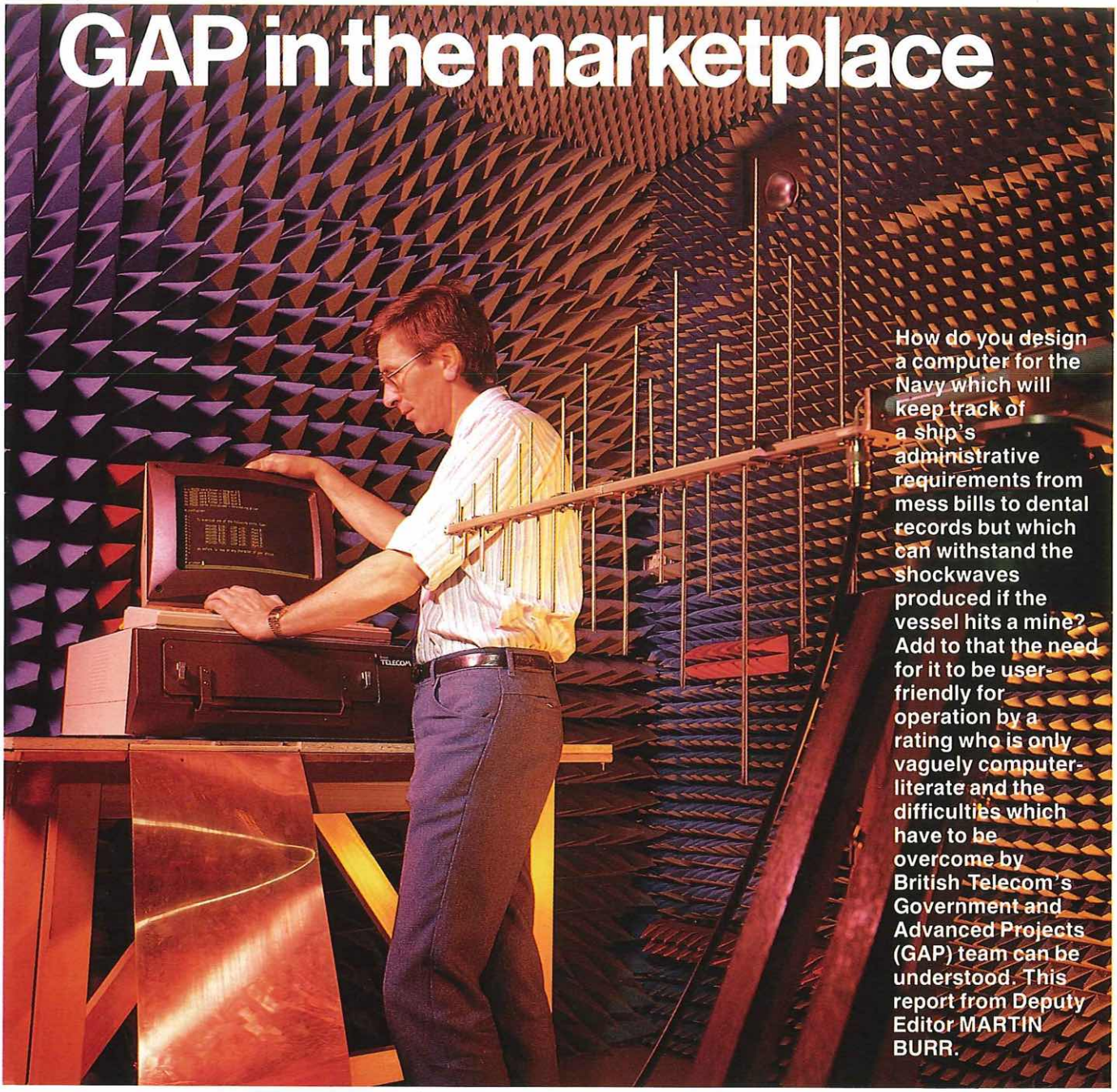
GAP in the marketplace



How do you design a computer for the Navy which will keep track of a ship's administrative requirements from mess bills to dental records but which can withstand the shockwaves produced if the vessel hits a mine? Add to that the need for it to be user-friendly for operation by a rating who is only vaguely computer-literate and the difficulties which have to be overcome by British Telecom's Government and Advanced Projects (GAP) team can be understood. This report from Deputy Editor MARTIN BURR.

The Navy's Oasis 4 contract presented a typical problem for British Telecom's GAP team. The contract involves supplying computers for a range of ships including aircraft carriers, frigates and nuclear submarines to handle administration and support information systems in the daily running of what are virtually floating cities.

A similar scheme is being trial tested at an Army site. AQUAS, or Army Quartermasters Stores, involves the computerisation of a great variety of supplies, and, if successful, the system may be extended to other Army camps.

But military projects account for only 10 per cent of the work carried out by GAP who design, develop and market advanced products and systems to meet the specialised needs of government and commercial users, from top secret defence applications to automated office systems.

And systems developed initially for the military can have much wider application, like the M6400 unit which has been designed as part of the Oasis 4 project and which would be suitable for use at a police incident centre as well as on board a ship. It contains two of the latest M6000 series of computers backed up by 'intelligent' batteries, all protected by a special ruggedised casing designed to withstand rough handling at sea.

The unit weighs 200kg and is supported by rubber mounts to minimise vibration from the ship's screw. If the mains power is cut off, the 'intelligent' batteries sense this and begin to close down the system gracefully without losing valuable data. Then, when the mains supply is restored, if the batteries are not sufficiently charged to handle another power cut they will not allow the computer to start up again until they are – in case there is a second break in power.

The M6400 unit has been rigorously tested along three axes – sides, top and bottom – at 10g and 30g. ▷

Above: David Crosbie, product development and testing manager, sets up a test for TEMPEST equipment in a radio quiet room. Specially screened to prevent any radio signal entering from the outside, the room makes it possible to accurately measure any radiation exuded by equipment under test.

BRITISH TELECOM MAKING IT WORK

Opposite: executive engineer Jim Milne testing an M6400 unit containing two computers and 'intelligent' batteries which will protect data in the event of a power loss. The unit is protected by a ruggedised casing designed specially for the Navy to withstand rough handling at sea on ships like *HMS Illustrious* pictured leading a convoy off Gibraltar.

It must continue to function at 10g, and although not expected to work at 30g, it has to be robust enough not to fly apart and injure the operator. If the ship was struck by a missile or hit a mine, the resulting explosion could send a shockwave of that magnitude along the length of the vessel.

The GAP team is also developing a powerful M6600 computer which will weigh less than 30kg and which can be 'yomped'. One of the world's first rugged units of this kind, it would have many non-military uses from building sites to use by customs officers on a drug surveillance project.

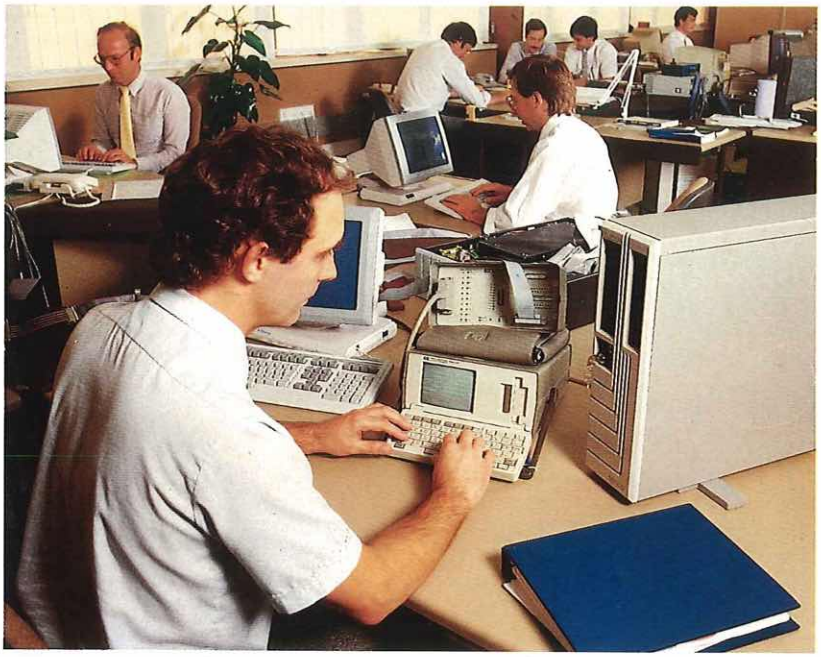
General manager of GAP, Roy Gibbs, set up the team two and a half years ago. They are a 44-strong unit with 35 engineers and clerical backup, and Mr Gibbs places more emphasis on the team spirit and commitment to their projects than on formal structure. GAP's work divides into roughly three areas – supplying top level security equipment under the TEMPEST scheme to protect information, developing encryption or coding units to protect data in transmission, and devising multi-user computer systems tailored to customers' individual needs.

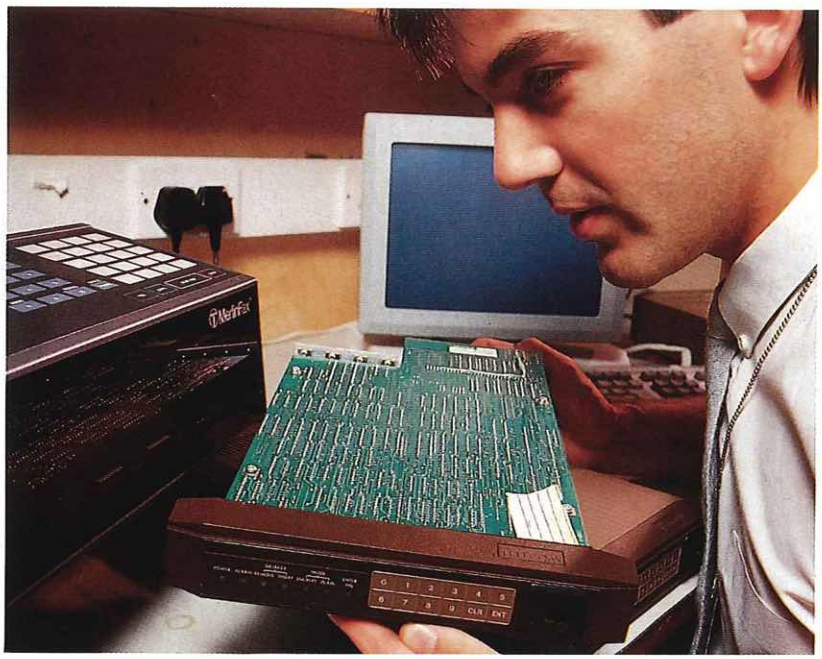
TEMPEST is the generic name for equipment on which all compromising emanations have been suppressed, so a spy, either industrial or from a foreign power, cannot even detect transmission, let alone intercept it. TEMPEST equipment has been certified and fully-approved for use at an extremely high level of classification.

All computers exude radiation which could be picked up quite easily outside the building in which they are being used. But GAP's M4000T series computers which have been modified to meet TEMPEST requirements give off no radiation

whatever. Optical fibres or double-screen coaxial cables can be used as required for interconnection.

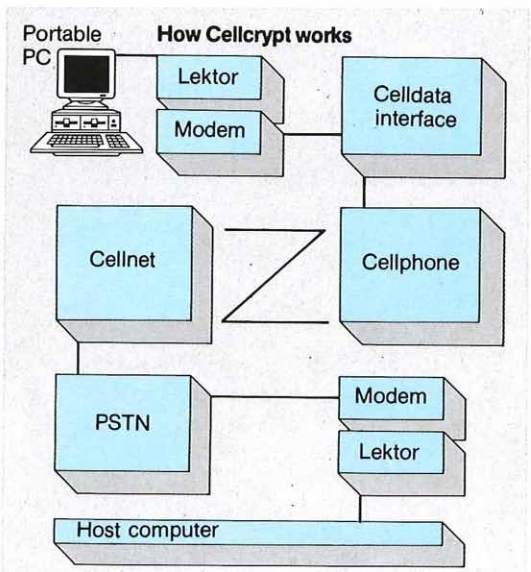
TEMPEST products available from GAP include the M4204T Workstation with two disc drives, keyboard and monitor. The Genicom 3000 series of TEMPEST printers are available with the M4204T. The complete system will provide a basic workstation which can be used for word processing, database management and spreadsheets as well as operating a networked workstation for larger resource sharing systems. There is also a M4213T computer which has a removable hard disc so sensitive information does not have to be left on the machine. Other TEMPEST products such as a ▷





Top: development engineer Vincent Maund works on the 6500 computer in GAP's software development area.

Above: technician Robert Walker checks for faults on a Lektor encryption unit.



'dumb' terminal and selected items from the M6000 range are planned.

There is also a need for adequate security for information sent through the public networks now that more and more organisations are communicating by electronic means rather than letter post. This is being done in many cases with scant regard for security at either the source or the destination of the data despite the fact that methods of attacking such data are becoming increasingly subtle, whether by simple eavesdropping or even changing the meaning of data being transmitted, and in some cases actually preventing its transmission or reception.

To prevent interception or sabotage, GAP have developed the Lektor encryption unit which can be incorporated into almost any type of communication between two parties, and which effectively acts as a portcullis to keep unauthorised people out of the system at both ends.

Lektor takes its name from the encryption device James Bond stole from the KGB in the spy film *From Russia With Love.* GAP were trying to devise a name for their encryption device when an engineer saw the film on TV and suggested Lektor.

Two versions of Lektor are available – for encrypting messages sent over facsimile machines, and for interface between workstations or computers. Lektor is secure because operators at both ends have to turn the machine on with an individual token containing information about the user as well as keying in a personal key number. Then, the two Lektor machines generate a unique key or code for use in that one communication only.

When data is sent through the Lektor encryption device, eavesdropping or sabotage is impractical as anyone breaking in on the line will get a readout of undecipherable nonsense.

It has many governmental and commercial applications from a company transmitting sensitive information which could affect share prices to a police force worried about tampering with its criminal record files. A system called Cellcrypt allows data transmitted over a Cellnet link to be encrypted by Lektor, and GAP are planning to widen its use to encompass telex, personal computers, slowscan TV and even speech.

Apart from security devices, GAP also supply the M6000 range of multi-user computer systems, performing the role of systems designer and integrator with systems tailored to the needs of each customer, whether it be for corporate databases or local government networks. The UNIX operating system allows for multi-user and multi-tasking.

A recent brief was to produce a system for a West London prison where the information on hundreds of inmates had to be kept on site – from schooling requirements of young offenders through special diets and medical records to release dates. And as an added problem, not all of the 12 terminals were in the same building. The system was a success, and orders have been taken for other prisons around the country.

The GAP team, therefore, has already proved its versatility with projects ranging from the computerisation of dental records in Leeds to a data network system for the North Wales police force. Other varied projects look certain to follow. ■

TESTERS

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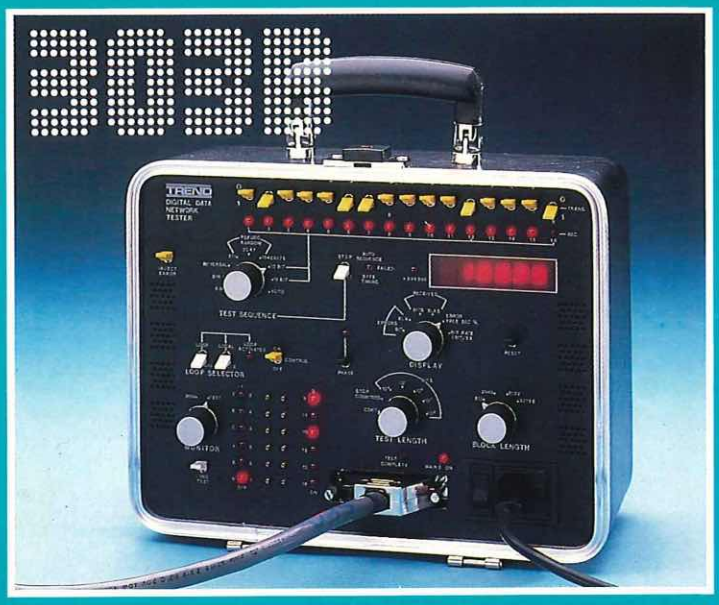

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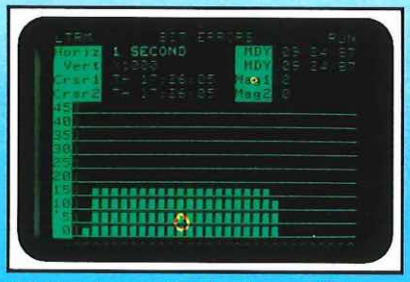
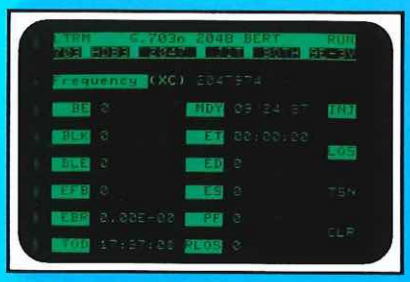


12 Options - 6 Displayed/Printed Simultaneously

BERT

All Options

RESULTS



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Streamlining the Social Security system

The Department of Health and Social Security faces an enormous operational task in paying out more than £40 billion a year in one billion payments to its 20 million claimants. The operation – which engages nearly 120,000 staff and costs more than £1.8 billion a year – had to be made more efficient and British Telecom has played an important role in making successful changes.

The key to better DHSS services is encapsulated in an Operational Strategy to connect about 500 Social Security local offices and about 1,000 Unemployment Benefit Offices to mainframe computers which hold claimant records. It is anticipated that 35,000 terminals will be online to this network by 1992.

The DHSS's paper-based system of records and information was, and in many instances still is, under severe pressure. It often prevents claimants from getting their full entitlements and means that they often need to go to different offices in order to claim different benefits.

The new system will allow the operation of what the department has called its 'whole person concept' where a claimant can get any benefit from any office anywhere in the country with a minimum of fuss and bother.

In the Government consultative document 'Reform of Social Security' the basis for the new structure for Social Security is described as:

- a system which directs help to those in need
- simpler benefits with more sensible rules
- a soundly based system which the country is able to afford
- a modern computerised service.

The Operational Strategy, first launched in a Green Paper in 1982 seeks to provide that computer service, modernising not only the means of assessment and delivery of benefit but also bringing ▷

Three members of British Telecom's account management team who worked on the DHSS project. From left to right: Bela Yorke, senior national account manager; Alan West, national account manager, and, Steve McConnell, in charge of the 'social welfare' group of accounts.

BRITISH TELECOM MAKING IT WORK

the support of Information Technology to the DHSS's administrative and decision process.

The strategy takes a long look forward over the next 10-15 years in order to lay down a technical and procedural framework which can accommodate change, work in complete unison and protect the privacy of individuals.

Direct access to all claimant information will ultimately be provided to staff through a data network conforming to international standards (the first network on this scale in the world) to a number of large mainframe computer sites which will hold the vast numbers of individual records.

The enterprise makes up the largest collection of computer projects ever undertaken by the government and British Telecom has won major contracts to design, supply and maintain computer systems and networks in the face of stiff competition from other companies.

A main priority of the strategy was to build upon the large investment in computer support to help DHSS local offices. Supplementary Benefit operations were most in need of support and improvement and led to the introduction of the Local Office Microprocessor Project (LOMP).

British Telecom bid, against international competition, to supply the Merlin M4000 microprocessor range and was awarded the contract to supply a total of 2,700 microprocessor systems during 1985.

These systems enable the department to computerise the assessment of weekly supplementary benefits, direct payments for such things as gas and electricity and casepaper location using light pen bar codes to provide information on the whereabouts of casepapers at any given time.

This first stage of conversion to computer working required the installation of about six M4000 machines and associated equipment, such as printers, in each local office.

Its success rapidly led to expansion and in August this year, British Telecom was awarded a further contract to upgrade 2,000 existing systems by supplying larger disc drives and more memory to enhance processing capability. The contract also covered 750 additional systems to cope with Income Support and Social Fund calculations and the supply of M6000 Unix based equipment used centrally by the Department of Health and Social Security in Applications Development.

The Unemployment Benefit System is networked through British Telecom's Packet SwitchStream Service. Large and complex, it enables almost 1,000 Unemployment Benefit Offices (UBO's) and Limited Benefit Offices (LBO's) to exchange on-line information with the Department's mainframe centres at Livingston and Reading. Implementation was completed, on time, in November, this year.

The system was a massive step forward in telecommunications and computing terms for DHSS, replacing a batch processing system which received paper tape input over the British Telecom 'Nightline' teletype service.

Network

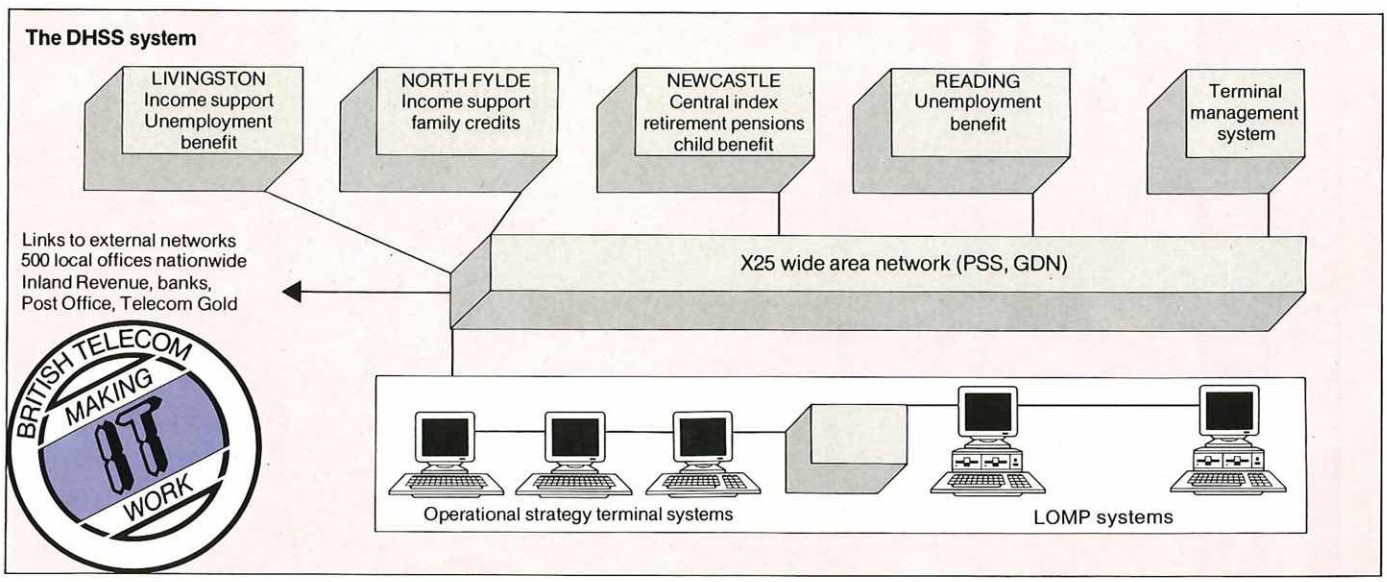
The new network service has about 850 PSS Datalines installed to 800 offices and is handling input from 25,000 VDU's and 1,000 terminal controllers with traffic levels running at 250,000 transactions per day.

An on-line enquiry system has been set up giving UBO and LBO staff immediate access to computer-held claimant records. It has eliminated much of the previous form filling and enables work to be completed where it arises.

The network is believed to be the first successful demonstration of the ability to communicate freely between computers of different manufacture in a very large administrative environment.

It is, therefore, of great strategic importance that British Telecom, and the DHSS's Operational Strategy are both committed to the International Standards Organisation specifications which have made the upgrading of the Unemployment Benefit System a success story for all the organisations involved in its development, installation and continued high level of service. The proof of success lies in its availability figures, which are currently at more than 99 per cent across the board from UBO to mainframe and back.

Another major victory for British Telecom was its successful bid for the DHSS's Strategy Terminal



System which encompasses the provision of VDU's, terminal controllers, terminal management systems and application protocol. It enables local offices to access each DHSS Benefit mainframe across an X.25 Network.

British Telecom were shortlisted for the supply of this major system in August 1985 with two other companies, Wang and Honeywell, and BT's demonstrations were set up by a team comprising BT Applied Technology at Newcastle; Major Customer Projects (MCP), who managed the bid; and Government National Accounts.

Specifications were demanding and negotiations protracted and the fact that the company won the contract in the face of such stiff competition shows how much BT has moved into the field of supplying whole systems rather than just equipment. In addition to the hardware, the department is also getting a complete system using BT Applied Technology software skills, MCP's skills in project management and the Business Systems Support Unit's (BSSU) skills in providing customer training, systems installation, commissioning and maintenance.

In total the contract runs for 17 years which in the Information Technology business is a long time. Over this period BT'S Government National Accounts and associated Divisions will continue to work closely with DHSS as new requirements develop to ensure that solutions are produced. ■

A prescription for healthy management

British Telecom is currently helping local authorities and health regions to meet all their communication needs with modern telephony equipment including integration of speech and data through the same system.

Modern, independent office systems are being supplied, including facsimile machines, wordprocessing systems, electronic messaging and desk top computing.

With staff moving around wide areas, mobile communications are becoming increasingly important. As well as portable telephone systems, British Telecom pagers and Voicebank facilities are allowing professional staff to deal quickly with the needs of the community with a flexible approach which makes the best use of both their time and resources.

Consultancy on voice and data communications is important too. Typically, consultancy can advise on the merits of the use and cost of public versus private networks for the specific group in question or the best combination of networks.

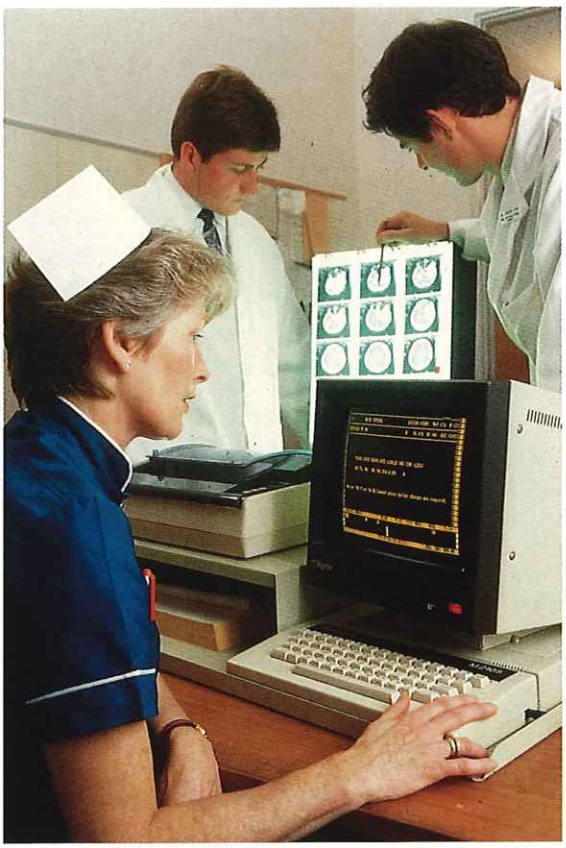
Installation, training and maintenance are also offered as part of a package deal. BT is working with several professional groups to help develop information systems to meet specific needs. Trading Standards, for a good example, use TS Link - a service with Telecom Gold messaging linked to the organisation's National Information Service.

Both health and local government need to exchange data and information over large geographic areas. As one of the largest IT users in Europe, BT has the experience to develop information and application systems having the communications capability that health and local authorities need.

About 100 account managers located in the 30 BT districts look after 500 separate accounts in the sector with central co-ordination by a specialist National Account Group.

Professionals in health and local government need to manage information from a variety of sources relating to a single case.

BT is developing a 'case handling' ability to collect and manage data electronically. In the future, professionals will be able to access, edit, integrate and pass information from any location around their numerous sites. It will also be possible for parts of that information to be seen by the public either electronically or on paper - making people better informed about the services available and creating easier access. ■



Town halls and health authorities all over Britain need good communications to ensure that administration can be effective over widely spread locations. Today, the community is demanding information and many councils are now setting up neighbourhood offices.

Healthnet is useful in hospitals and the National Health Service as a communications and information system. It transmits forms, letters and memos over the telephone as well as extracting data from the transmitted forms and turning it into clinical management information. Healthnet uses M2105 terminals.

BRITISH TELECOM MAKING BT WORK

On course for customer training

Information Technology is playing a large part in the working lives of most British Telecom employees and to help them – and a rapidly growing number of outside customers – the company has placed great emphasis on IT training to the extent that it is leading the field in Britain today.

British Telecom's Training Department offers specific Information Technology appreciation training covering the role, use, and concepts of IT, or job skill training in the operation of a particular system.

Appreciation training, with an emphasis on general understanding, is available for those encountering IT for the first time. It covers most aspects of computer literacy aimed at those experiencing IT for the first time and the emphasis is on general understanding. Managers in particular are taken through some of the key issues related to implementing and supporting IT systems in an office environment.

At Bournemouth, the BT Management and Commercial College undertakes a wide range of training activities to develop the IT skills of the company's sales and marketing staff through training courses, development programmes and distance learning packages. In the early days of IT training, the college focused on computer-based products and sales but the work now covers Voice and Data Communications and Corporate Information Strategies.

The standard courses fall into two categories – those that provide a foundation of skill or knowledge upon which the delegates can build, and those that enable the delegate to undertake a specific task such as selling new IT based products.

Foundation courses are currently run in datacommunications, microcomputing and voice telecommunications. Once the delegate has a foundation of knowledge, the training related to the launch of a new product – a Local Area Network, for example – is considerably more effective. Development, however, often requires more than training courses and for some specialised roles staff need to be trained in a number of skills and to gain experience in the workplace.

The college constructs programmes to achieve this and one recently developed for IT sales staff involved 10 weeks of training over three months.

Courses were interspersed with periods of work in local offices. Modules in selling and account management techniques, as well as business awareness and the applications of IT in business, were also included by calling upon specialist groups in the college.

Programmes of this type combining various specialist elements are not only run for IT sales staff but also for account and marketing managers. A key element in the success of such programmes is that the college can bring together a range of specialists in one place.

Although the principal role of the college is to develop BT's own staff, customers, too, are increasingly calling or its courses and training programmes. Customers now account for about 20 per cent of the Bournemouth college activities and the volume of customer-training is expected to double over the next three years. At the moment, most of the training is for systems managers from companies which have bought a BT system and training is delivered on large switching systems and Local Area Networks. The volume of training is expected to increase as the LAN market develops and as customers become more aware of the benefits to be gained from properly managed information systems.

Initiatives

The college has about £1 million worth of equipment on site including switching systems, LANs, microcomputers and a sophisticated data network all of which are used to enhance training activities as well as to provide a 'shop window' for those customers attending the courses.

The decision to locate the college in Bournemouth was made to take advantage of the excellent range of hotels in the town and one hotel, the Savoy, has been equipped to provide extensive training facilities exclusively for the college. A part of the college is now outstationed in London providing IT training mainly for BT customers.

Training Department is also involved in a number of Artificial Intelligence (AI) initiatives and the college is helping to develop an intelligent training manual. The basis of this project is to assist people to use computer systems by learning from their own mistakes and exploiting their partial knowledge to make intelligent guesses.

The department is represented on a consortium reporting to the Government's Manpower Services Commission on tools and techniques available for use on AI training projects.

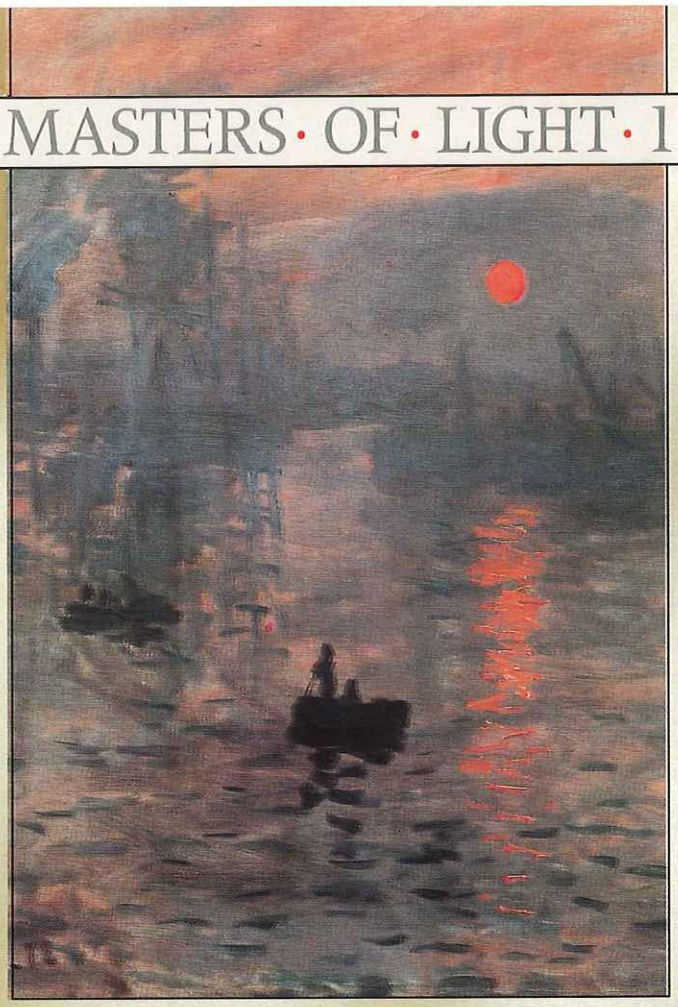
Another initiative concerns expert systems and the aim is to develop a training design aid to recommend appropriate training solutions and costs.

Information Technology is also being applied to the training methods used within BT Computer Based Training (CBT) – a flexible learning method used since the late 1960s.

Interactive Video is a relatively new medium to British Telecom training, but is currently being used successfully within the company. It has all the benefits of CBT but has the added benefits of such things as linked sound, moving video pictures and computer generated graphics overlaying.

A number of distance learning facilities have been set up in the department where students can work at their own pace on transmission systems, network, appraisal and counselling. BT districts/units are also installing CBT and interactive video equipment in local learning centres to save travelling costs and to enable students to learn when it suits them. ■

· MASTERS · OF · LIGHT · 1 ·



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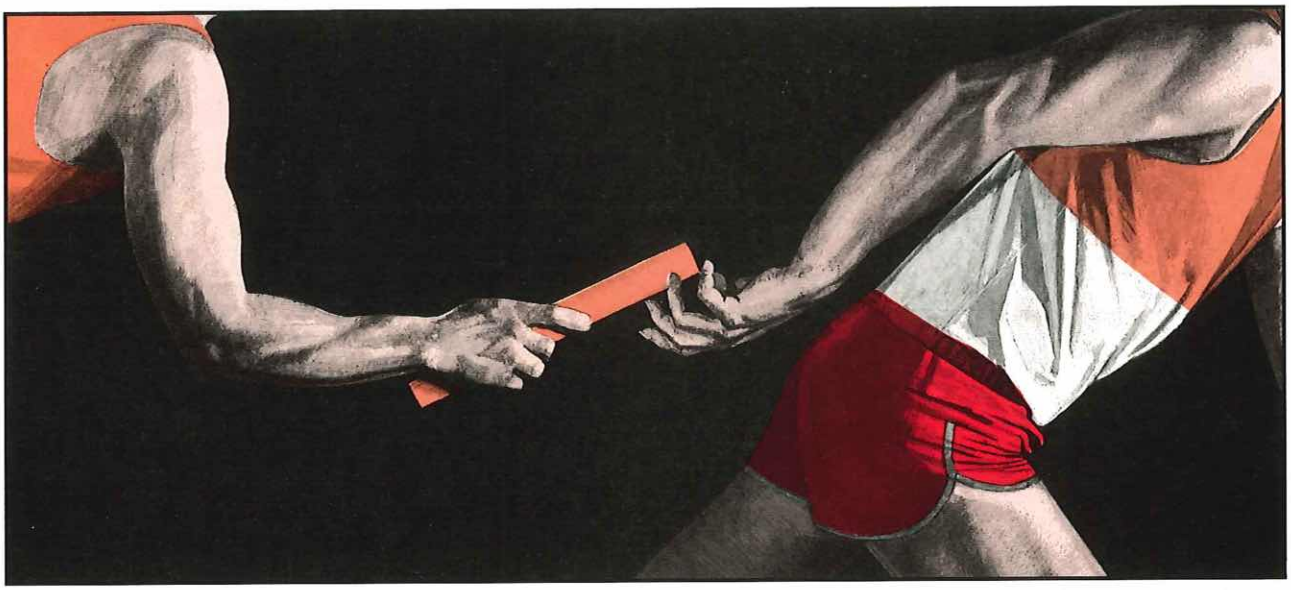

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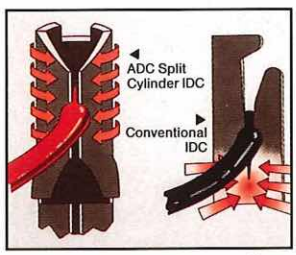

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Telexcellent! Still growing after 55 years

Peter Gladman

When published 55 years ago the first edition of the UK telex directory listed just 14 London-only connections. Thirty years later it had grown to 6,000 UK-wide users. Today, more than 114,000 UK lines are able to call two million telex users throughout the world, and the service is still growing.

In its 55 year history telex has been used to clinch business deals, catch criminals, speed the news of celebrations and disasters and disseminate sporting results. The service has come a long way since 1932, and changes in the network's operating system as well as in the teleprinters and terminals that generate the messages would be beyond the imagination of telex's original customers.

For about five years the microchip has been making its impression on telex exchanges. In many places Strowger has given way to electronic stored program control, computerised exchanges efficiently, accurately and noiselessly guiding each call to its correct destination. Such exchanges allow remote control and testing facilities for maintenance staff and many exchange-based services to users.

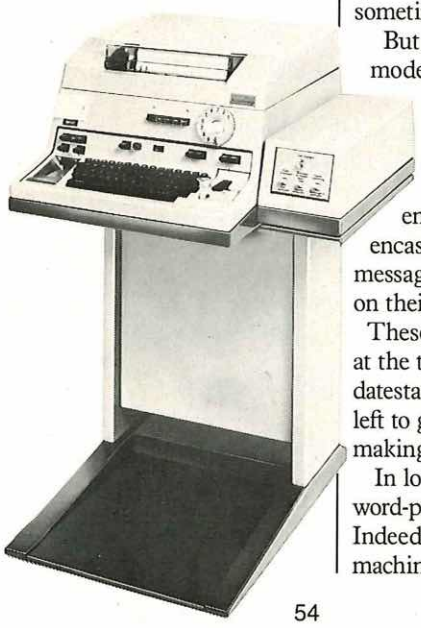
Date and time insertion on messages, individual call unit printout, short-code dialling, diverting calls to other telex numbers and the combining of unrelated numbers into one group for receiving calls are just some of the services now available. And the option of having itemised accounts is one of several new services which telex are hoping to make public in a year or so, thanks to stored program control.

Links between exchanges have been digitised and are able to carry more 'conversations' with less room for error. Circuits to customers' premises now operate at voice frequencies and no longer carry the sometimes dangerous 80 volts they used to.

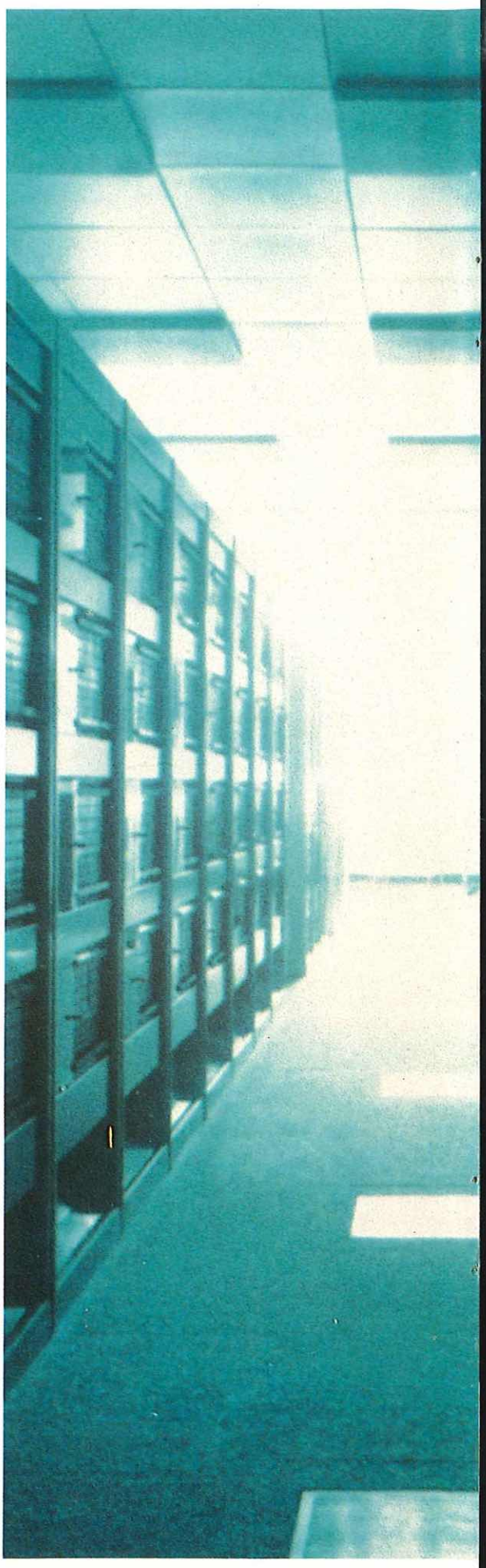
But the most dramatic changes wrought by modern electronic technology are to be seen in the terminals at which telex messages are prepared. Gone are the clattering, ink-stained machines whose keys were menacingly thrust at the operator from the end of six inch levers. In their place, the plastic encased microcircuit boards programmed to store messages – incoming or outgoing – and send them on their way at the further touch of a button.

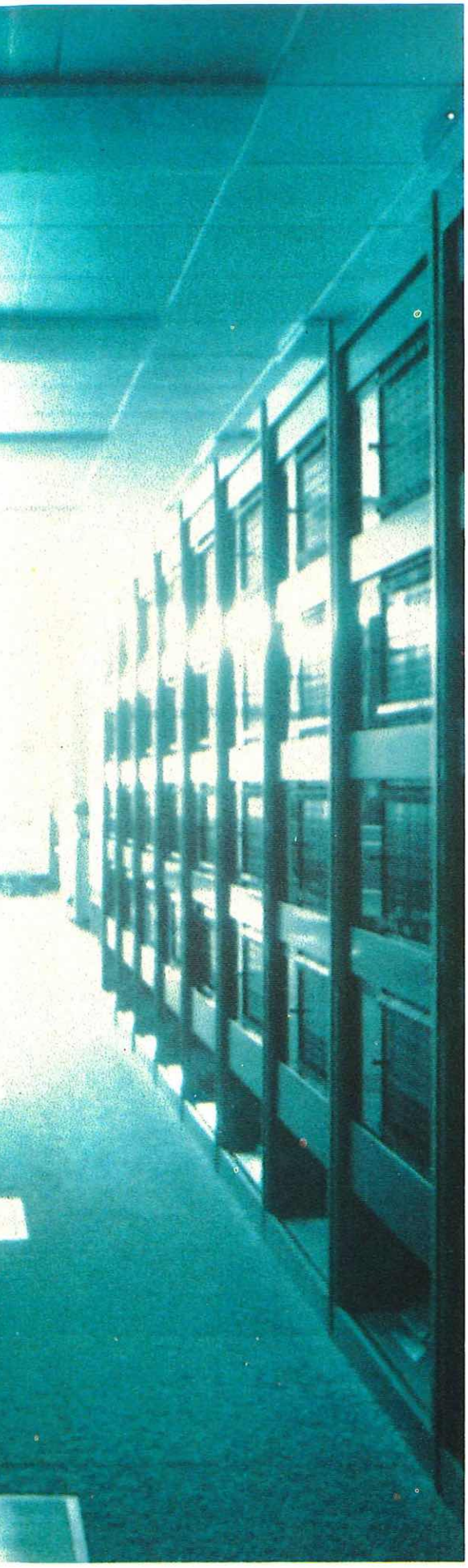
These new machines can be set to send messages at the time the customer wants, time and datestamped, to one or more destinations, and then left to get on with the job completely automatically, making repeat attempts where necessary.

In looks, they are almost indistinguishable from word-processors and other desktop workstations. Indeed, one of the features of some modern telex machines is that they will work quite happily with



This telex machine, although only dating back to around 1970, looks cumbersome compared to contemporary models.





Left: a modern electronic stored program control telex exchange which guides each call to its correct destination efficiently, accurately and noiselessly.

these other terminals, taking instruction and sending text prepared on them over the network.

From 1932 to 1954 the interconnection of telex machines was by telephone. The separate telex network was introduced in November 1954, integrating at the same time with the international telex service.

Connections were still performed manually and the cost of a three-minute call from London to Manchester would have been 10p. When the automatic service was launched in August 1958 the cost was still 10p for the same call.

Today that automatic call would cost 36.25p including VAT – a reasonable increase considering that at the same modest rate of inflation a typical three-bedroomed semi would now be about £3,000.

In July 1985, telex celebrated its 100,000th connection, and despite alternative means of sending text – Datel, facsimile and E-mail – the network has continued to grow. Because telex works to universal standards, any country can set up a network and be in contact with two million machines throughout the world, far more than is possible with other systems.

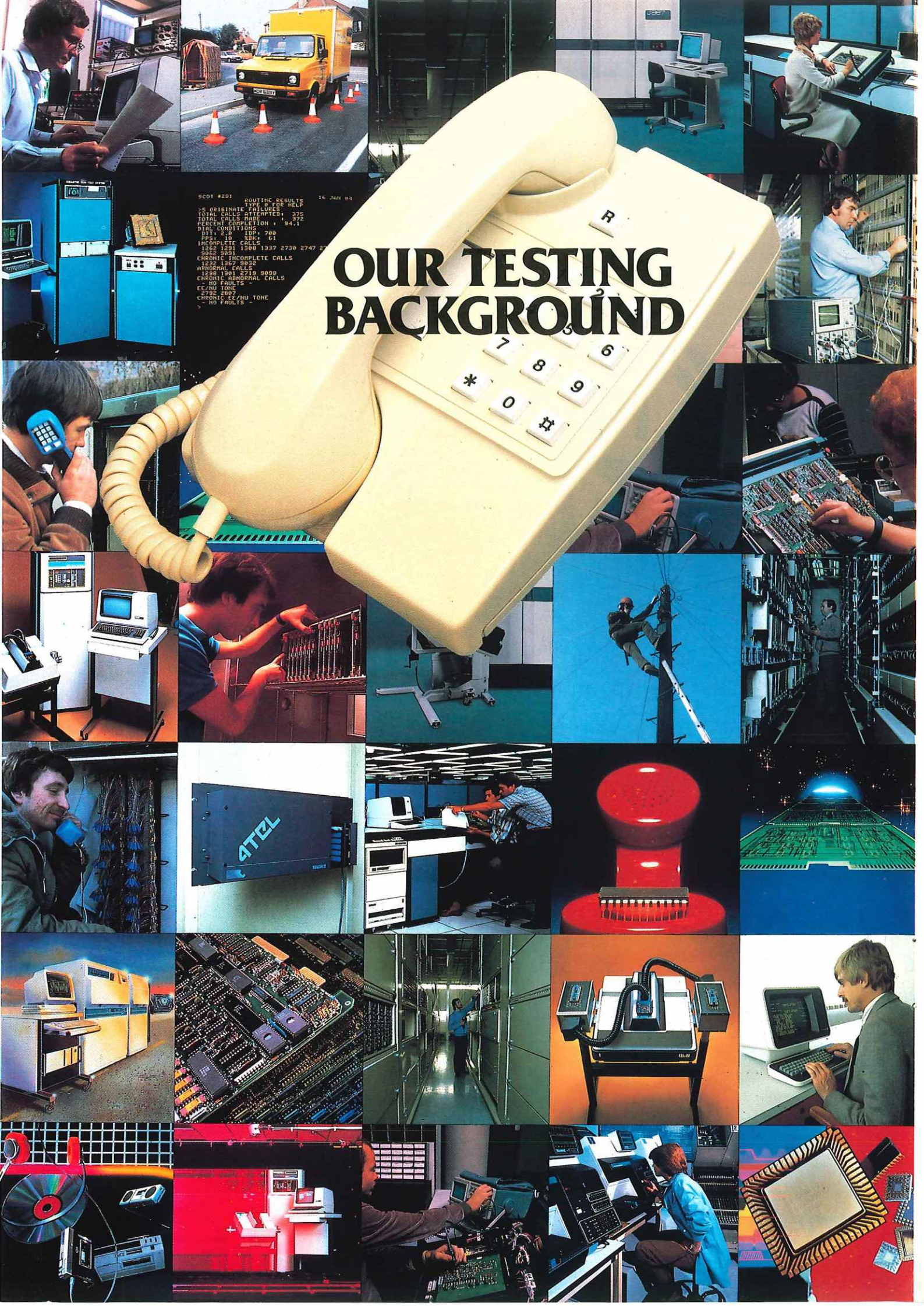
Its established world-wide base still commands the loyalty of telex users and many have now taken on the newer services, finding other applications for them with little or no effect on their telex traffic.

Most E-mail companies find that interconnection with telex is an essential part of the service offered to their customers.

Many pessimistic forecasts have been made signalling the imminent demise of telex, but in spite of these it seems set to continue developing and extending its twilight years into the 1990s and beyond. Whether it will achieve its 100th birthday remains to be seen, but by then telex is likely to bear as little resemblance to the current system as it did in 1932. ■

Below: the latest telex terminals are almost indistinguishable from word-processors and other desktop workstations. They can be set to send messages at any required time, to one or more destinations, time and date stamped.

Mr P Gladman is telex advertising manager.


OUR TESTING BACKGROUND
SCOT #291 16 JAN 84
ROUTINE RESULTS
TYPE 0 FOR HELP
>5 ORIGINATE FAILURES
TOTAL CALLS ATTEMPTED: 375
TOTAL CALLS MADE : 372
PERCENT COMPLETION : 94.1
DIAL CONDITIONS
DTT: 2.0 IDP: 700
PPS: 10 XBK: 61
INCOMPLETE CALLS
1262 1291 1300 1337 2730 2747
5062 5091
CHRONIC INCOMPLETE CALLS
1232 1367 9092
ABNORMAL CALLS
1238 1301 2719 9098
CHRONIC ABNORMAL CALLS
- NO FAULTS -
EE/NU TONE
2792 2807
CHRONIC EE/NU TONE
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Microwaving goodbye to cable links

Fred Harrison

A subtle change to the skyline is about to herald a new breakthrough in business efficiency. Small antennas are set to mushroom on the roofs of commercial buildings now that British Telecom has perfected ways of using digital microwave radio for individual customer requirements.

In today's competitive marketplace it is vital that customers can be offered service quickly – but providing high speed data links at short notice can be a problem. Low cost microwave radio equipment which is quick and convenient to install is now available and a more advanced radio system is also under development to operate over greater distances with improved serviceability.

Long-haul radio systems operating in the four, six and 11GHz frequency bands are being used to provide 140MBit/s transmission in the British Telecom trunk network. Typical hop lengths of about 50km are achieved by these systems which link together around 200 radio stations distributed throughout the UK.

Radio systems operating at higher frequencies such as 18GHz have a shorter range and are better suited to short-haul or local distribution applications. This type of equipment is now being used increasingly by major customers such as banks and large businesses.

Low capacity digital radio connects two or eight MBit/s circuits from an exchange directly into the customer site. It can also be used within the British Telecom network for linking remote communities and for providing alternative routes to cable. The traffic applications for these sorts of links include PSTN (public switch telephone network), private circuits, and interconnection with other network operators such as cellular radio operators.

Until now, low capacity radio equipment has been cumbersome and time-consuming to install. The equipment has also been expensive

A microwave radio cabinet, containing the transmitter and receiver circuits, and antenna installed on a outdoor field trial.

when compared to providing service on a cable and so the use of radio has been limited to those applications where cables were not available, or where only temporary service was required.

However, with the growing demand for two and eight MBit/s links, it was recognised that radio had a particular asset - the ability to provide service quickly and directly into a customer's premises.

A new, modern design of equipment was sought to overcome the main weaknesses of the existing equipment. Unfortunately no suppliers offered equipment which met all of the design objectives but 18GHz proprietary equipment manufactured by NEC of Japan met some of the requirements and a quantity was purchased to meet the immediate demand for service.

A second contract was placed to develop their radio further in line with the desired specifications. This new design of radio will give improved performance and easier installation, making radio an even more attractive solution for circuit planners. In addition, modern designs of radio are now significantly cheaper, making radio cost effective when compared with cable over all but the very shortest of distances.

Each radio link consists of a number of components. An indoor mounted unit provides the interfaces for connection to the customer apparatus, or to other transmission equipment at the British Telecom end of the link. A cable then links the indoor unit to the radio cabinet which can be mounted externally on a pole together with the antenna. The radio cabinet contains all the radio frequency (RF) components of the system and includes the transmitter and receiver circuits. Antenna sizes of typically two or four feet in diameter are used and these have to be positioned within a line-of-sight. Transmission over distances of up to 15km is possible using the existing radios, but the new radio will be able to operate over significantly greater distances.

The design of the radio takes into account the need for compactness to reduce the costs of transportation, installation, operation and maintenance. As an example, the size of the new outdoor unit is only one third of that of the equipment used in the past.

The transmitter receiver is designed for outdoor mounting to withstand normal environmental conditions with a weather resistant housing. In the proprietary equipment, to achieve cost-effective performance, four level frequency shift keying modulation has been applied to the RF stage. The new radio will employ phase shift keying to give an improved performance.

The two units (indoors and outdoors) are interconnected using a single multicore cable for the proprietary design. This cable carries all the input and output data signals, dc power, alarm and order wire signals which have to be exchanged between units. The new design will substitute this cable for two small coaxial cables to make installation easier. All connecting cables are designed to be flame retardant to the relevant British Standards.

One of the difficulties facing microwave radio engineers is the effect of varying radio-wave propagation conditions - the changes in the path that a radio wave takes from transmitter to receiver.

At frequencies of 18GHz, signal loss occurs because of rain. The heavier the rainfall is, the weaker the received signal becomes until a point is reached at which errors or loss of transmission occur. To reduce these effects, radio links have been designed to incorporate a fade margin and the new radio will have a more powerful transmitter and better receiver sensitivity than existing equipment.

This will give greater margins, improved availability and the opportunity to achieve much longer links. Due to the extra performance it will be possible to use smaller antennas making the external mounting arrangements simpler.

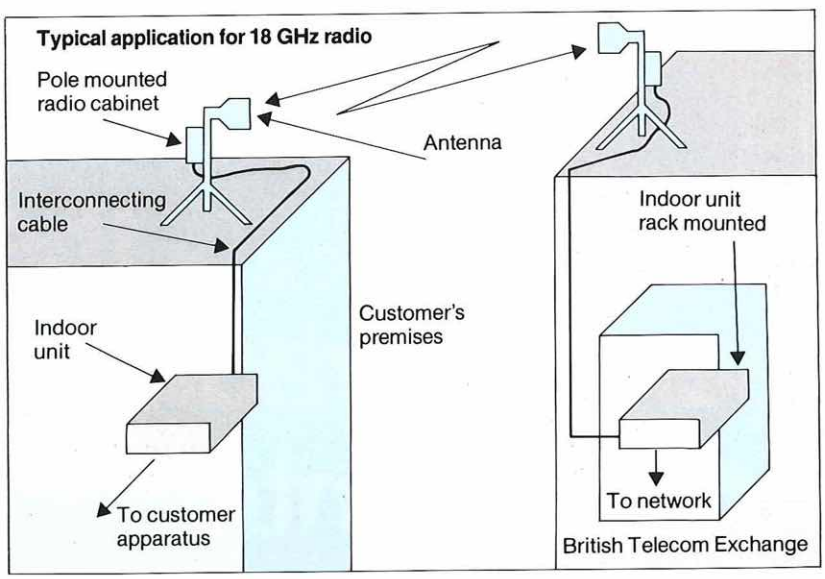
The proprietary NEC radio equipment is already providing service for many customers and further deliveries continued throughout the summer. Development of the new radio, however, is well underway with design work almost complete and a prototype under construction and deliveries should commence early next year.

Steve Bottom, an engineer for Private Circuit Services, inspects the outdoor radio equipment. Behind him are cabinets containing the indoor unit which provide the interfaces for the customer's apparatus.

Opposite: Mike Balcer, a technician with Private Circuit Services, adjusts indoor terminal equipment.

Below: This diagram shows a typical application for 18GHz microwave radio.

Mr F Harrison is head of radio systems engineering group in Trunk Transmission Systems Engineering Division.



Getting the message across... radiopaging goes transatlantic

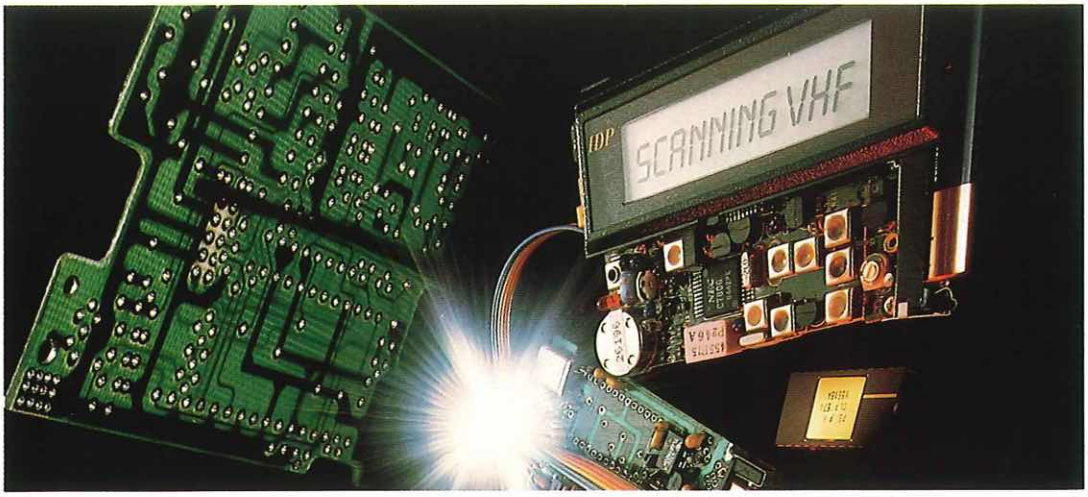
Tony Brett-Young

Rough scribbles on a cocktail napkin have led to the development of the world's first international radiopaging service. By next spring, British Telecom's UK customers will be able to use a single pager capable of receiving personal messages both at home and in the major cities of the USA.

Under an exclusive agreement with an American consortium, British Telecom Mobile Communications looks set to beat the Atlantic – and time barriers – with a device which looks like an ordinary pager but which operates over a range of different frequencies.

The seeds of the idea for international paging are to be found in some preliminary jottings on a cocktail napkin, at present kept in a safe deposit box in southern California.

The napkin scribble – and the new concept – came out of a meeting between two American businessmen and three NASA communications experts three years ago. They had set themselves the task of developing a plan for extended-range paging in America. To do so, they needed to weave together many local and regional paging systems – all operating on different VHF systems.



Opposite: British Telecom Mobile Communications are set to revolutionise business messaging around the world by offering the first ever international radiopaging service under an exclusive agreement with American consortium Metrocast.

The transatlantic pager and its internal components.

Their ingenious solution to the problem will help the transatlantic business community and the early signs are that the system, which can hold messages to beat time barriers and send them directly to the person intended, will prove to be a popular money-spinner.

The real stumbling block in the past has not been delivering the signal from one location to another (whether by satellite, landline or a combination of both), but how to deliver the message to the end-user once it gets there. In other words, a signal could be delivered from one side of the United States to the other - and indeed across the Atlantic - but unless there was an agreement between the two carriers, plus a common frequency, the message could not be transmitted to the customer.

The potential for an American and international paging service attracted the five inventors, even though they were not involved in the radiopaging industry at the time. Their confidence in the project was subsequently backed by Metromedia Telecommunications, and together they formed a joint venture, Metrocast, in October 1985, to develop a wide-area paging system.

By applying highly sophisticated technology to existing telecommunications systems the Metrocast approach has made an extended-range system not only available but economical.

The secret of the pager is the PageScanner, a microprocessor-based device which uses the latest custom VLSI (Very Large Scale Integration) technology. It converts the conventional fixed-frequency paging receiver into a scanning receiver which skips across 14 VHF paging frequency channels looking for paging information intended for a particular subscriber. This means that Metrocast can connect with different local VHF paging channels to provide an extended-range network.

Each PageScanner contains a nationwide Post Office Code Standardisation Advisory Group (POCSAG) paging system synch code. POCSAG is the radiopaging international standards organisation, and the synch code is transparent to all of their existing paging systems.

Through direct interaction with the Metrocast ground processor system, a radiopaging transmitter can programme the PageScanner's extended-range capability.

Customers of the Metrocast service in North America will be able to receive paging coverage in the UK - again without the need to change pagers. The British pagers will be manufactured through joint arrangements between Metrocast and NEC, and will be similar to British Telecom's familiar Message Master. It works as normal in the UK.

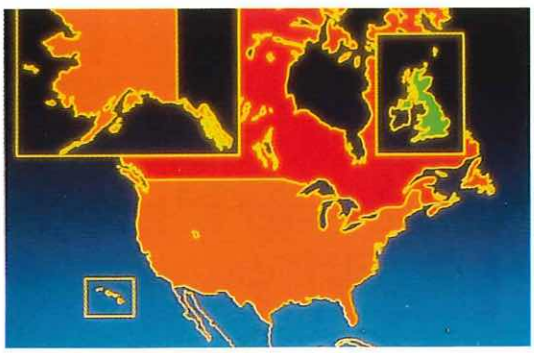
In the USA, customers simply notify Metrocast when they are travelling to another area. Messages are then forwarded to the paging company in that area for transmission, either immediately or - to allow for time differences - at a chosen local time.

When British Telecom Mobile Communications (BTMC) customers are linked into the scheme it will be controlled either by BTMC's existing radiopaging bureau, or by customers themselves through a direct input service. Any BTMC Metrocast customer who travels from the UK to the USA, and later Canada, simply informs the radiopaging bureau - or the network's computer system through direct input - of his destination before leaving the country.

Radiopaging signals will be sent between the UK and the Metrocast control centre in San Diego by satellite or undersea cable. The system will then hold all messages for a specified period while the customer is travelling, before forwarding them to the USA for transmission in the appropriate location.

As international business travel becomes routine, the need to keep in immediate touch also assumes major importance in today's competitive environment. Just as Concorde transformed business travel habits a decade or so ago, the international pager is likely to revolutionise business communications around the world in the future. ■

Mr T Brett-Young is a press officer with British Telecom Mobile Communications



Customers will be able to receive messages both at home and in all the major cities of the USA (marked orange) and later Canada (shown in red) with one single pager.

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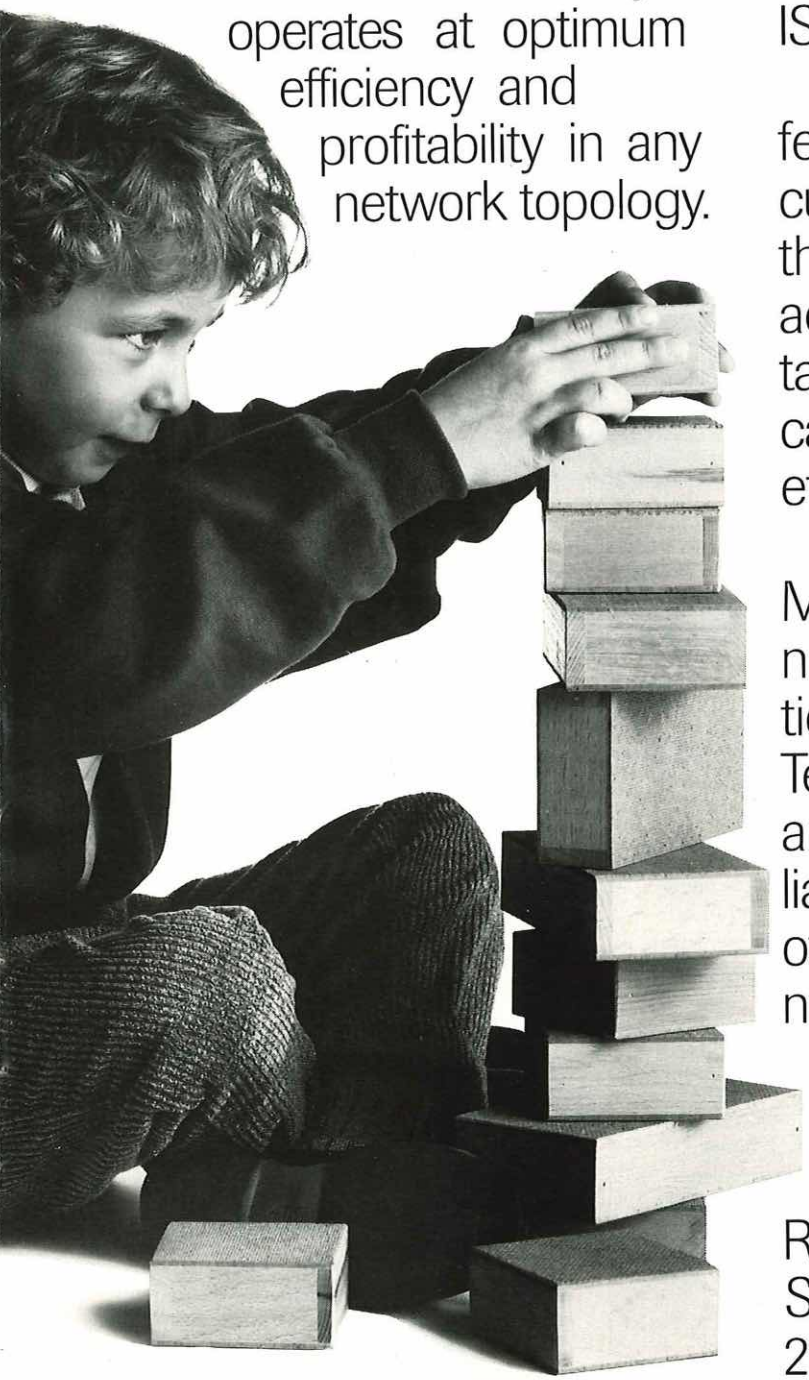

It can also look after the needs of business as well as those of the private individual, with such services like freephone dialing and the powerful combination of ISDN and CENTREX.

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An engineer removes a faulty integrated circuit card within a packet switched exchange which is linked to an Operation and Maintenance Centre by the ADPN (Administration Data Packet Network).

Remote computers cut costs by miles

Philip Marlow-Mann and Ross Jenkins

British Telecom's £1 billion a year network modernisation programme is already revolutionising telephony services. But few people realise the extent to which the new digital exchanges depend on support computer systems, often located many miles away. This article looks at the new and special network which links the two together.

One of the main advantages to British Telecom in introducing digital telephone exchanges is the provision of centralised support systems remote from the exchange, with specialised staff and equipment supporting a large number of customers.

System X and AXE 10 exchanges are being introduced into service with District Data Collectors (DDC's) to handle billing and other information, Operation and Maintenance Centres (OMC's) to handle fault control and exchange management, and traffic management from the Network Traffic Management Centre at Oswestry. These centralised support systems are designed to help British Telecom improve services to customers and reduce costs.

A network is required to connect such exchanges with their support computers and carry this administration data. The fact that the core telephony service will rely on the support computers for its satisfactory operation puts great onus on this support network, the size of which is considerable, with 600 digital local telephone exchanges and a variety of support computers needing interconnection.

A new and special network, called the Administration Data Packet Network (ADPN) has been designed to enable the digital local exchange processors in the Public Switched Telephone Network to communicate with computers which provide the centralised support functions.

The support computers which will operate with these exchanges through the ADPN are:

District Data Collectors which collect bulk data such as statistics and billing; Operations and Maintenance Centres which receive fault reports and allow maintenance staff to alter exchange data and software; Network Traffic Management Centres which receive traffic data, and Digital Exchange Support Systems which provide for local management.

The ADPN is a cost saving network based on

packet switching techniques. Initial designs had considered the use of point-to-point private circuits to form the network, but even with the use of multiplexors to obtain economies through concentration, an inflexible 'cats cradle' of circuits would have resulted.

With packet switching, however, each connection is able to carry a number of simultaneous calls, the data being switched in individually addressed packets to different destinations. This reduces the number of circuits required at the local digital telephone exchange from as many as seven to one and for the same reason allows savings to be made at support computers, freeing resources to earn revenue from customers.

Other advantages inherent in a packet switching network include full error protection, automatic alternative routing and a higher level of security than private circuits.

Because of its experience in designing and operating packet switched networks British Telecom's Public Data Network (PDN) was asked to propose a network tailored to the particular requirements of the project. The network architecture that was adopted is a 'hybrid' that comprises a network of district-based packet switches dedicated to the application, but interconnected into the PDN to take advantage of national addressing, trunk routing and network management facilities.

Billing and operational information from telephone exchanges is locally switched to the District Data Collectors and The Operations and Maintenance Centres, whilst traffic management information is passed over the PDN to Oswestry. All ADPN addresses are contained in a 'closed user group' that bars access to any unauthorised caller, providing a secure private network within a network.

Installation

Because operation of digital telephone exchanges within the PSTN will be dependent on the service given by the new network, performance of the highest quality is essential. In order to achieve this, equipment proven in service within the Public Data Network will be used for the ADPN together with the same comprehensive network management.

A turnkey solution is being provided covering design, installation and operation. The 30 packet switches that make up the initial network have to be installed by April next year, increasing significantly the number of switches managed within the PDN. The first sites at Bristol, Cardiff and Guildford have already been installed, and a schedule for other districts is being followed.

Districts will receive a fully managed, maintained network and a programme for the installation of the packet switches has been agreed. Staff have been advised when the packet switch serving their District is likely to be installed. The datalines, which connect the exchanges and support computers to the network, are ordered by Districts as and when required – more than 300 orders have been received so far.

Should any difficulties arise in using the new network, one office in each District will be responsible for advising PDN's Network Management Centre of the details, and its staff will then arrange for any testing and fault clearance which might be required.

Some Districts are actively considering the use of a packet switched network for their own communication needs, and see the ADPN as a logical extension of their network design. In such cases, a technical review of the overall network is carried out, and new maintenance interfaces between PDN and the District are defined.

One of the chief advantages of the ADPN is that, being a switched network, it can easily accommodate the changes which occur as various rationalisation plans are approved and implemented at District level.

The ADPN is being designed to cope with a variety of network changes. The intrinsic switching flexibility of the packet switch guarantees that local requirements can be supplied in sufficient time at minimum additional cost.

British Telecom has recently launched a corporate systems architecture for Information Technology products and services, known as Open Network Architecture (ONA).

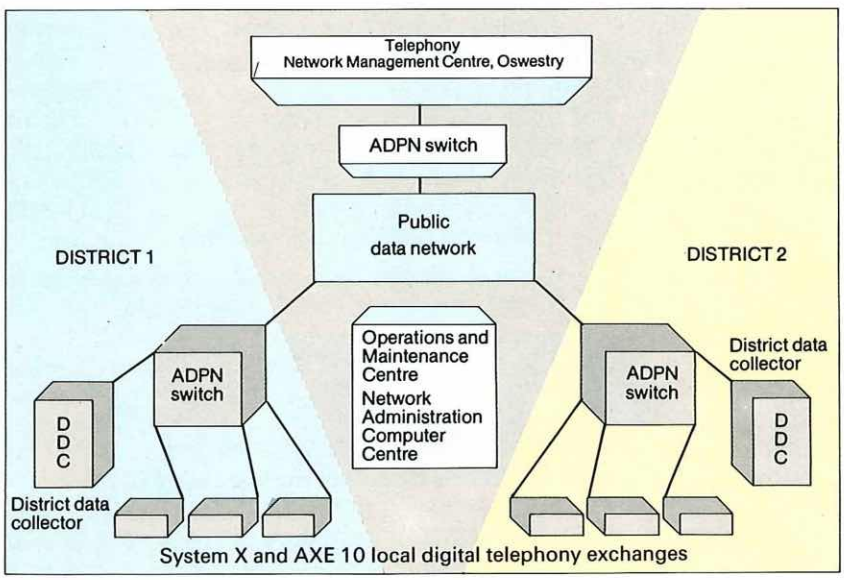
The systems now being interconnected through the ADPN were specified three years ago, when Open Systems Interconnection standards, on which ONA is based, were considerably less well advanced than they are now. Nonetheless, the ADPN will meet the administration network needs of the business both for the current interfaces and for the ONA future.

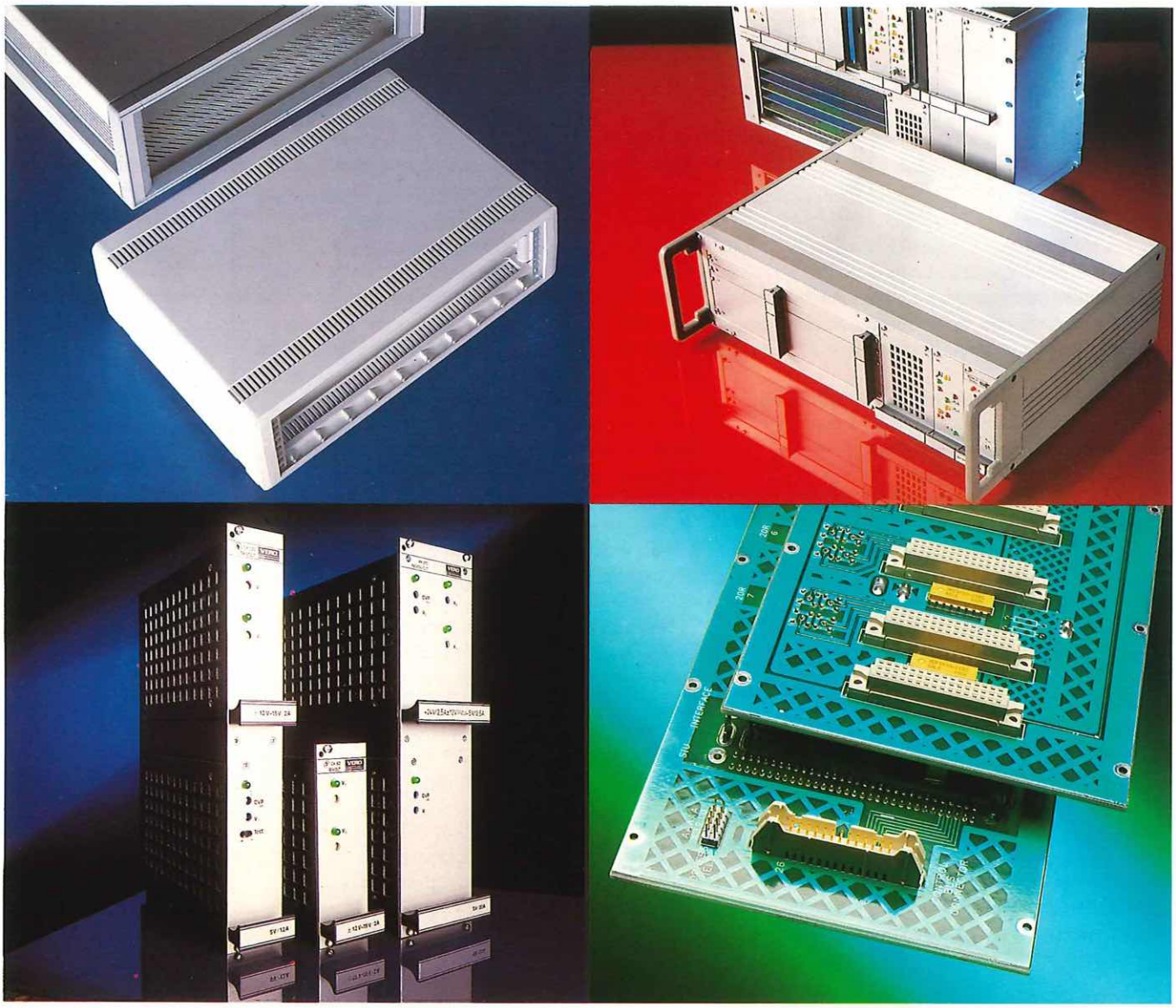
There is a growing awareness of the need to rationalise the varied networks currently in place within the company to form a coordinated corporate data network. Internal use of private circuits within some Districts has reached levels where alternative networks must be considered if service to customers is not to be compromised. Such networks must carry traffic supporting both the operation of exchanges and customer facing services within Districts and headquarters.

Through its vital role the ADPN is ideally placed to provide the infrastructure on which much of the corporate traffic will be carried, and will therefore become a major part of any future network. ■

Below: this diagram shows how the ADPN links the digital telephone exchanges with the District Data Collectors and the Operation and Maintenance Centre.

Mr P Marlow-Mann works in Network Services Sales. Mr Jenkins works for Local Network Switching and Operations.





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LEADERS IN ELECTRONIC PACKAGING TECHNOLOGY

Taking up the challenge

British Telecom's first priority must be to get the basics right — a phone that is delivered on time, works well and is repaired quickly, says new Chairman Iain Vallance who took over from Sir George Jefferson in October.

"Our basic service in Britain is our bread and butter. If we get that right, we have the financial strength, the technological skills, and the people to continue to develop at home and abroad, and to build an information services company on an international scale," he said.

Mr Vallance, 44, said BT must accept the challenge of creating a company of which customers, shareholders, staff and management can be proud, but warned, "It needs a revolution to turn British Telecom into the kind of company its customers deserve and for which all of us in it want to work. It's a process that we started some time ago to reverse the attitudes of a state monopoly where the bureaucrats, not the customers, took pride of place. And I believe the most successful revolutions are led from within."

He believes the radical change will be achieved through developments in two main areas — technology and BT's workforce. The transition from electro-mechanical to the digital age will mean clearer lines, faster connections and fewer faults. "It's a massive task but we can do it," he said. Speaking of the staff, Mr Vallance called them "a workforce among the best in the country".

But he stressed the importance of a drive for greater efficiency and responsiveness, and promised to establish a more constructive relationship with trade unions. "Communications between management and staff need to be improved and I have initiated a thorough-going review of internal communications," he said.

Mr Vallance has voiced his determination that BT will push ahead to provide a telephone service that bears comparison with any in the world.

The message is clear: "We must concentrate on getting it right first time, every time and do it cheerfully. We're going to make sure we earn the right to be the customers' natural choice. We want customers to choose us because we are the best, not because they have no choice," he said.

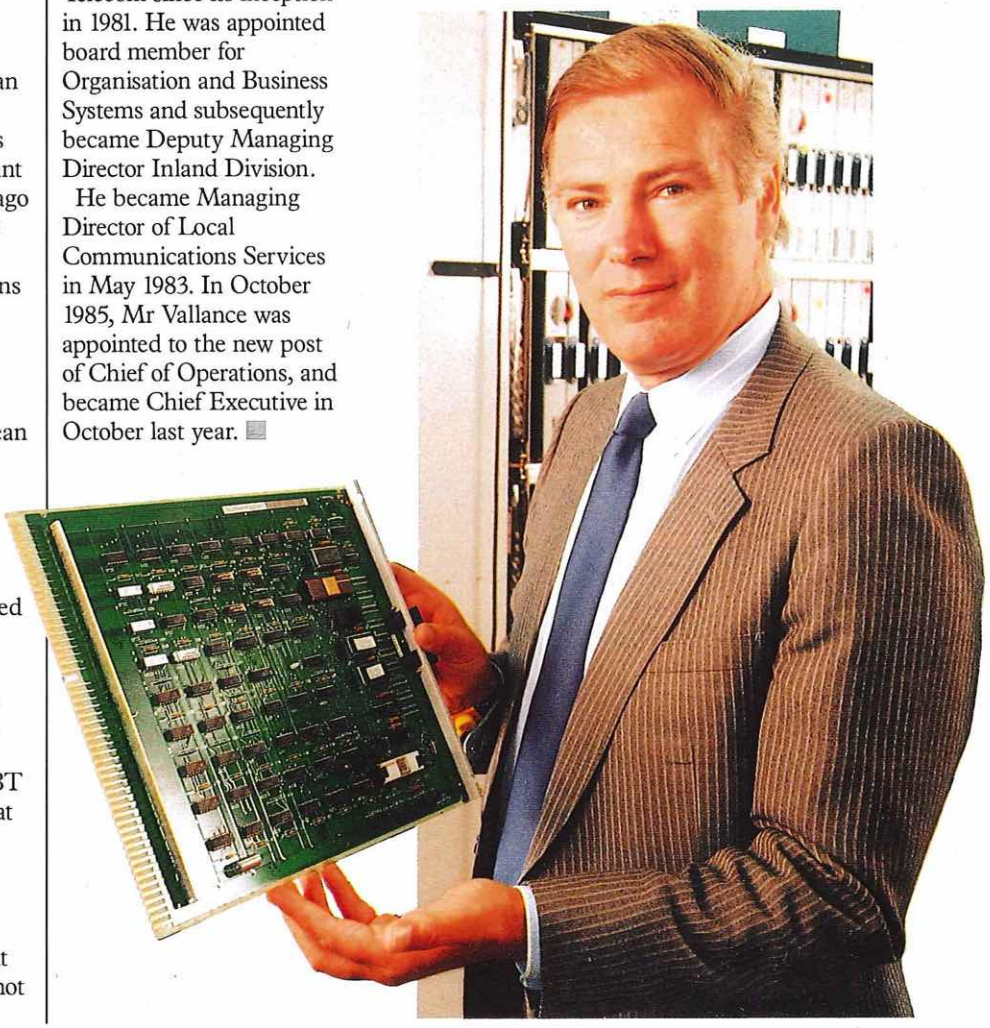
Mr Vallance was born in London but spent his early years in Scotland where his father was Director of the Post Office. He was educated in Glasgow and Edinburgh Academies, Dulwich College and Brasenose College, Oxford, where he took a BA in English. After university he joined the Post Office, and at the age of 32 he made history by becoming its youngest-ever director.

Mr Vallance has been on the Board of British Telecom since its inception in 1981. He was appointed board member for Organisation and Business Systems and subsequently became Deputy Managing Director Inland Division.

He became Managing Director of Local Communications Services in May 1983. In October 1985, Mr Vallance was appointed to the new post of Chief of Operations, and became Chief Executive in October last year.

Below: British Telecom's new chairman, Iain Vallance, pictured at the Wood Street System X exchange.

Bottom: Sir George Jefferson who recently retired as chairman of British Telecom.



Sir George Jefferson, who retired as chairman of British Telecom at the end of September, masterminded the transformation of the company from the era of the state monopoly through to the competitive private sector company of today.

He was the first chairman of the new company when it split from the Post Office on October 1, 1981, having been appointed Chairman-designate of BT the previous year.

Taking BT into privatisation was a monumental undertaking and an immense triumph for Sir George as BT's flotation was the first of its kind; he proved that such an enormous stock-market flotation was indeed possible. He was of the firm belief that competition would be of great benefit to BT and negotiated a regulatory structure for the company which kept up the incentive to improve efficiency while giving it a chance to adapt to its new environment.

Then Sir George faced two main tasks: bringing investment in BT up to the record levels of today, making up for years of under-investing; and putting foward the idea of the 'customer is king'.

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The newly introduced MS² underground jointing system from 3M means that British Telecom engineers can now obtain the complete solution to cable management from a single source.

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For more details, talk to John Holtham, Telcomm Products Group, on Bracknell (0344) 58742. 3M United Kingdom PLC, Bracknell, Berkshire, RG12 1JU.

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Quality and the wind of change

British Telecom has announced details of improved service targets, and continuous 'quality of service' reports – detailing progress against declared service targets – will be published every six months.

The first report concerns higher performance targets to be reached by the end of the 1988-89 financial year. Target areas include repairs – dramatically highlighted by the October gales – installation, operator services, public payphones and the reliability of the network.

Under the standard repair service covered by line rental, BT will aim to restore service for business customers within five working hours, and within nine working hours for domestic customers.

Fault reports will be taken at any time – 24 hours a day, seven days a week. These standards represent a significant improvement on the current target of restoring service within two working days. Around 62,000 repairs are carried out each day.

The company completes 52,000 installation orders each working day, and the new arrangements are intended to enable all customers to have orders for new lines and equipment carried out by appointment with follow-up research.

BT's operators currently handle around 2.7 million calls every 24 hours, including 50,000 to the emergency services and nearly 1.5 million directory enquiries. The target is that operator calls should be answered within 15 seconds.

Checks on public payphones earlier this year revealed that the proportion working was 77 per cent, against 84 per cent last year. But the service has since improved, and, by the end of September, the proportion working across the country reached 85 per cent. The target is 90 per cent.

The report shows that only 2.2 per cent of local and 4.3 per cent of trunk calls fail to be satisfactorily connected. Modern digital exchanges are being installed at an average rate of two a day, with about 1,000 already in service. Half of BT's capital investment – running at £6 million a day – is spent on network modernisation.

- The picture shows that BT's repair service can respond to catastrophies like the October gales.

One-stop viewing

A computer-based system for streamlining the administration of cable TV networks, enabling operators to provide a single contact point for all customer enquiries, is now available from British Telecom.

Produced in collaboration with DEC-based software house Business Management Systems, the System Administration and Control (SAC) is the first of its kind of all British design. It will be offered for use by network operators and providers.

The system is effectively a front office providing one-stop shopping. BT's software covers all aspects of network operation and administration allowing operators to respond quickly and efficiently to all customers' enquiries covering marketing, sales, installation, faults, accounting and billing.

The SAC software manages the operation, control and customer accounting on switched-star or tree-and-branch cable TV networks, covering all services which may be provided on these networks – TV channels, FM audio channels, pay-to-view TV, video library TV and videotex information like Prestel. ▷

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Quality... Innovation... Success, the essence of Olympic competition and the hallmark of the 3M Company. 3M is proud to be a worldwide sponsor of the 1988 Olympic Games and sponsor of the British Olympic Team. The British Olympic Association is vested with the responsibility of raising the £2.5 million needed to send the British Team to the Games. To achieve this target demands the dedicated efforts of supporters throughout the country. The 3M British Olympic Fundraising Awards, presented under the auspices of the British Olympic Association will be in recognition of these efforts. 1988 Award for the most funds raised regionally. 1988 Award for the most imaginative fundraising event. 1988 Award for the most successful single fundraising event.

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SAC is already used on three BT Vision networks – Swindon, Coventry and Westminster. It is planned to introduce the system on the Milton Keynes network shortly.

BT takes off

Business travellers in the fast lane can now work right up until their flight is called thanks to British Telecom.

A new Communications Centre has been opened in Terminal 4 at Heathrow Airport offering word processing, Prestel, and an electronic mail terminal as well as more familiar BT services, such as worldwide direct dial telephones, international faxing and telex.

Comfortable booths are provided, attended by specially trained staff who will assist customers to make contact with locations ranging from Biarritz to Bombay to Newport and New Orleans.

There are also facilities for the more casual traveller. Details of the range of BT telephones will be available and staff will take on-the-spot orders or follow up sales leads at a later date. BT Phonecards will be on sale and calls can also be paid for in foreign currency and by major credit cards.

Appointment

Mr Norman Penny, British Telecom's Customer Services Senior Manager at Canterbury, has been appointed Chairman of the Council of the Institution of Electrical and Electronics Incorporated Engineers (IEEIE).

The IEEIE, with a membership of around 19,600, is the UK's largest professional body for technician engineers and engineering technicians in the electrical and electronics field.

Born in 1948, Mr Penny joined the Post Office in 1965 as an apprentice and, following a year in the United States, was promoted Assistant Executive Engineer on private network design at Stanmore. In 1974, he was promoted Executive Engineer spending a year as a systems analyst in London before transferring to Inverness to work on product and network maintenance. He was promoted to Head of Consumer Products in Canterbury in 1983.

Market milestone

British Telecom's Telephone Marketing Services are making telemarketing history by handling a record 100,000 calls a day. The calls are both inbound to TMS's Bristol-based operation and outbound from the London-based control rooms. Calls logged on the TMS computers involve 140 clients using a wide range of telemarketing techniques integrated into full marketing programmes.

TMS has substantially increased its call handling capabilities over the last year with over 700 inbound and 100 outbound lines. The operators interface with some of the largest and most up-to-date computers and switching equipment in the world, ensuring fast and efficient call handling when linked to specially developed analysis software.

Racing ahead

Motor-racing drivers travelling round the circuit at high speeds can now keep in contact with their pit crews through a mobile telephone system specially designed and developed by NJC Telecom –a major BT Mobile Communications dealer. The system uses a specially adapted helmet and incorporates a background noise reduction facility which allows the racing driver two-way telephone communication.

More 'tube' stations

British Telecom Vision has launched its latest cable TV system at Washington, Tyne and Wear. The system covers more than 13,000 homes in the New Town area, and subscribers will have access to up to 12 entertainment channels, including first class reception of BBC and IBA programmes. The system also provides five FM radio channels.

The full launch of satellite TV in Washington followed a two-month market trial involving 300 local homes. BT North East District had run a basic community TV network for the area since 1969 carrying BBC and ITV, but it was only a year ago that BT Vision began up-grading it and increasing its capacity to carry satellite delivered TV channels.

Subscribers have the choice of four programme packages ranging from £8.95 to £15.95 a month. The eight additional channels cover films, sport, children's programmes, pop videos and general entertainment.

Cool in a crisis

British Telecom's Leopard telex machines have been installed for crisis communications in the event of a nuclear fuels emergency. British Nuclear Fuels have opted for the Leopard in preference to other teleprinters on the market. It enables messages to be sent and received during message preparation, and non-urgent calls to be stored for later transmission, leaving the machine free for urgent incoming calls – an essential facility during emergencies.

The Surrey Ambulance Service have also decided to use Leopard to help them spring into action more quickly. After field trials earlier this year, the ambulance service decided to install 20 terminals throughout the county to provide a fast and inexpensive way of getting vital information about emergency calls and hospital appointments to all the stations.

Electric Economist

Hotline, British Telecom's online business information service, has now added the full text of *The Economist* to its range of high-quality, comprehensive and up-to-date international information.

The Economist, read in over 180 countries, is recognised as one of the major sources of informed comment on finance, world affairs, politics and science. It is concerned with news as well as views, and includes weekly sections on the U.S., Europe, Britain and the rest of the world. There are also regular special surveys on countries or specific industries.

Dog and bone...

British Telecom is taking part in a pioneering scheme to use dogs as home helpers for the housebound and handicapped. The dogs are being trained to bring a cordless phone to a person on command wherever they are in the house or garden.

The scheme has been started in the Midlands, and BT is providing adapted cordless phones with cloth handles that can be grasped in a dog's mouth.

'Dogs for the Disabled' is the brainchild of Frances Hay who lives in Warwickshire and is herself disabled. Suitable dogs are selected through the RSPCA and Canine Defence League and professionally trained for three months with their prospective owners. After learning basic tasks like opening and closing doors, the next priority is being trained to retrieve phones.

Mrs Gladys Rainbow, pictured above, has the first of the dogs trained under the scheme, alsatian Rani. An amputee who lives alone, Mrs Rainbow, aged 67, said it was a great comfort to her that Rani can take the phone to her wherever she is. The scheme has given her the freedom to go out in the garden in her battery-operated wheelchair knowing that she can get hold of the phone in an emergency.

By including the full text of *The Economist* in its range of databases. Hotline offers users instant and easy access to current and past editions of this international news journal.

The service is available to anyone who has a microcomputer, modem and communications software.

Contracts

Chloride Power Electronics has received British Telecom approval for its uninterruptible power supplies and an initial contract has been placed for models with power outputs ranging from five to 20kVA. They are required to protect vital telecommunications equipment such as computers, exchanges and relay links from fluctuations and breaks in the mains supply.

Delta Communications are to provide British Telecom International with Digital Trunk Translators, an order worth more than £500,000. The DTTs will be used at BTI's new digital international switching centre at Mondial House, London, providing a link between the new digital exchange and the older overseas networks.

Landis and Gyr Ltd is to supply British Telecom with new microprocessor-based air-conditioning unit controllers. The units are used to cool high heat dissipating switching equipment and their microprocessor design represents a major step forward over existing equipment. They give BT total control with digital readout of programmed settings, actual temperature and humidity levels. The units also incorporate a diagnostic fault readout for easy maintenance.

John Noad (Ceilings) Ltd has been awarded a £140,000 contract to ▷

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design, supply and install high grade ceilings for the refurbished electronic equipment rooms at British Telecom's Keybridge House installation in London.

Siemens Telecommunications Networks Group has won a major contract to supply British Telecom with radio-relay equipment. The contract, initially worth more than £1 million, is for digital microwave transmission equipment to be used as part of BT's programme to convert the network from analogue to digital operation. The digital radio equipment will provide high-quality and high-capacity transmission on trunk routes between main exchanges.

Teradyne has won a major order valued at £15.7 million to supply British Telecom with an automated subscriber line test system which will help to serve Greater London's four million customer lines. Completion of the order is scheduled for April 1989.

Timeplex Limited has announced a two-year agreement with British Telecom International to purchase its recently-launched LINK Packetised Voice Server (LVPS). BTI will use the LPVS system for resale to end-users and in its international networking services.

Soviet connection

British Telecom customers in Britain who have comrades in Russia will now be able to dial them direct without having to go through the operator. The international direct dialling service has been extended to the whole of Moscow following negotiations between BT and officials of the USSR Post and Telecommunications Ministry and modernisation of the Moscow International telephone exchange.

IDD to Moscow was first introduced nearly 11 years ago, and extended to Kiev, Leningrad, Minsk and Tallin in 1980. But in 1982, as a result of technical difficulties in the Soviet Union, IDD was restricted to selected members in Moscow only, such as embassies and trade missions. Other calls had to be placed through the UK international operator who would then contact the Soviet operator to connect the call.

A cheap rate three minute IDD call to Moscow costs £2.11, excluding VAT.

Gassing by phone

British Telecom has won a contract worth more than £2 million to re-equip British Gas Southern's entire trunk communications network. The order, won against strong competition from home and abroad, is one of the largest private networks supplied by BT, and it is the first time that a complete ready-to-switch-on system has been provided entirely by BT staff.

It will enable the gas company to concentrate most internal telephone, mobile radio calls and data communications over a single integrated digital system which will also carry information about pressure and flow in the region's gas grid.

The new network will help improve the efficiency of customer service and internal communications as well as cut telephone costs. It will also provide much greater security thanks to the fail-safe MegaStream circuits which will back up the trunk microwave links in the event of radio equipment failure.

Helpful touch

Specially adapted pre-paid cards have been launched by British Telecom to make it easier for the blind and partially sighted to use Phonecard payphones.

The new cards, now available nationwide, have a notch cut into them so users can tell the correct way to insert the card by touch. Initially, 10 and 20 unit Phonecards (costing one and two pounds) will be on sale, but this will be extended to all value cards as existing stocks are used up.

A BT cassette tape giving instructions to help the visually handicapped use all types of payphone is available free from British Telecom Action for Disabled Customers, British Telecom Centre, 81 Newgate Street, London EC1A 7AJ, or by telephoning 0345 581456.

Bill protection

Customers whose telephone is their lifeline will be given extra protection from unnecessary disconnection due to unpaid bills. Following a trial in the North and West Midlands, British Telecom's Protected Service Scheme for elderly and disabled customers is being introduced nationwide.

Customers at risk can nominate a friend, relative or neighbour whom BT can contact if the bill remains unpaid after the final reminder has been sent. The nominee agrees to find out why the bill is unpaid and then try to arrange payment. BT will defer disconnecting the line to enable the problem to be resolved.

To join the Protected Service Scheme, customers should ask their local BT office for an explanatory leaflet and application form. The nominee is not personally obliged to pay the customer's outstanding bill.

Women speak up

A blow for sexual equality has been struck in the male dominated world of car telephones. Users of the top of the range Telecom Topaz mobile phone will be kept company by a mysterious woman's voice.

The cellular phone features the latest in hands-free technology which enables drivers to steer clear of trouble by telling it, or her, who to dial. The female voice answers each command to inform instructions and to ensure accurate dialling. Hidden microphones and speakers enable drivers to hold a conversation without taking their hands off the wheel or their eyes off the road.

Up to now, only a male voice has been featured on the phone, but a large number of customers, both male and female, have expressed a preference for a woman's voice.

TV for Europe

British Telecom International (BTI) has won £8 million contracts for the distribution of two new satellite television channels. The new channels are the first to be targetted to specific audiences in Europe and bring the number of satellite TV channels handled by BTI up to 14.

Film Success International will transmit programmes to the whole of western Europe, principally Spain. Transmissions will be in Spanish and English, and it is expected that the services will be received by hotels and apartment blocks who will be installing their own receive-only satellite dishes.

SCANSAT-TV3 is due to start transmission on New Year's Eve and will be a general entertainment channel aimed at the Scandanavian countries, Norway, Sweden and Denmark.

Payphone progress

British Telecom has ordered a further £23 million worth of equipment as part of its £160 million public payphone modernisation programme.

A large part of the new order is for equipment for the national launch of an automatic version of the company's credit card service by October 1988.

The new British Telecom credit card service will allow customers to make calls from any public payphone anywhere in the country without using the operator, and the charge will be automatically billed to their home or business telephone account.

The new orders were given to Plessey Telecoms Products Ltd and the service AccountCall was launched as a trial to customers in Bristol and Bath last year.

Boost for schools

British Telecom Liverpool District has given a boost to the area's schools liaison programme by donating and installing a reconditioned switchboard at Halton College.

The switchboard, with four extensions, forms a central part of the college's business studies department and will be incorporated into a practical training programme for ▷

Despite looking like flying saucers, these strange 'mushrooms' have a down-to-earth purpose. They are microwave dish aerials helping to bring better telephone links to the Channel Islands.

Pictured on the Island of Alderney, the old dish, covered by a protective radom, is seen being lowered while the new more powerful dish on the ground is waiting to be hauled hundreds of feet to the top of the radio mast.

There, it will link up with dishes on the new tower at Chilerton Down on the Isle of Wight – the highest in the UK – to bring a new era of communications to the islands.

As well as the strengthening of microwave links, new optical fibre cables will soon be laid from the mainland and the system will change from analogue to digital.

Seen lowering the old dish are British Telecom riggers Raymond Thomas (right) and Clive Herbert. BT helps the two island telecommunications authorities, Guernsey Telecoms and Jersey Telecoms, with all the islands' communications links.

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secretarial students, as well as being used by mature students training for re-employment.

A monitor telephone for use by tutors has been fitted to the system to allow instant evaluation of students' performances during practical training.

King-sized TV

British Telecom has donated a television projector with screen to the Bridgewater Centre for the Physically Disabled at Runcorn to help with the problems faced by wheelchair bound and partially sighted members when watching TV.

The donation, by BT Liverpool District, enables members to watch their favourite TV programmes on a screen nine times larger than normal.

Spreading success

Van Den Berghs, the company which retails such household names as Stork and Flora margarine, has turned to British Telecom's Voicebank for two-way communication between its sales force and head office.

The company's sales department successfully tested Voicebank, BT Mobile Communications' computerised voice messaging service, over a three month period. In April this year they decided to employ the service nationally.

Messages and information from other internal departments and customers, when delivered, are stored by the system's computer. They are then retrieved by the relevant company field executive. Messages are also sent from the Field Executives to Head Office.

A Voicebank number can be dialled 24 hours a day. Messages can be retrieved at any time, by dialling the same number and entering a personal code. Messages can also be saved or deleted.

Van Den Berghs operates ten sales districts and each one is headed up by an area sales manager. Broadcast allows each manager to leave the same message on each executive's mailbox at the same time.

Data matching

Users of IBM and IBM-compatible equipment can now communicate over British Telecom's public data network.

This will enable users to adapt and expand their networks to meet changing business needs without investment in new hardware or departing from established protocols.

The new services, known as MultiStream BPAD and SPAD, are now commercially available following extensive trials.

Turning the pager

For the first time in its history, British Telecom is offering customers a chance to buy a pager outright.

The latest addition to the company's product range, the Celebrity, will retail at £199.99, and is aimed at customers who demand style as well as function.

Radio therapy!

Top entertainers and personalities are taking part in a new weekly magazine programme for hospital radio, being sponsored by British Telecom.

Christmas tapes, which include a message to hospital patients throughout the country from the comedy duo Dame Hilda Bracket and Doctor Evadne Hinge, have been sent to more than 300 hospital broadcasting organisations in the United Kingdom.

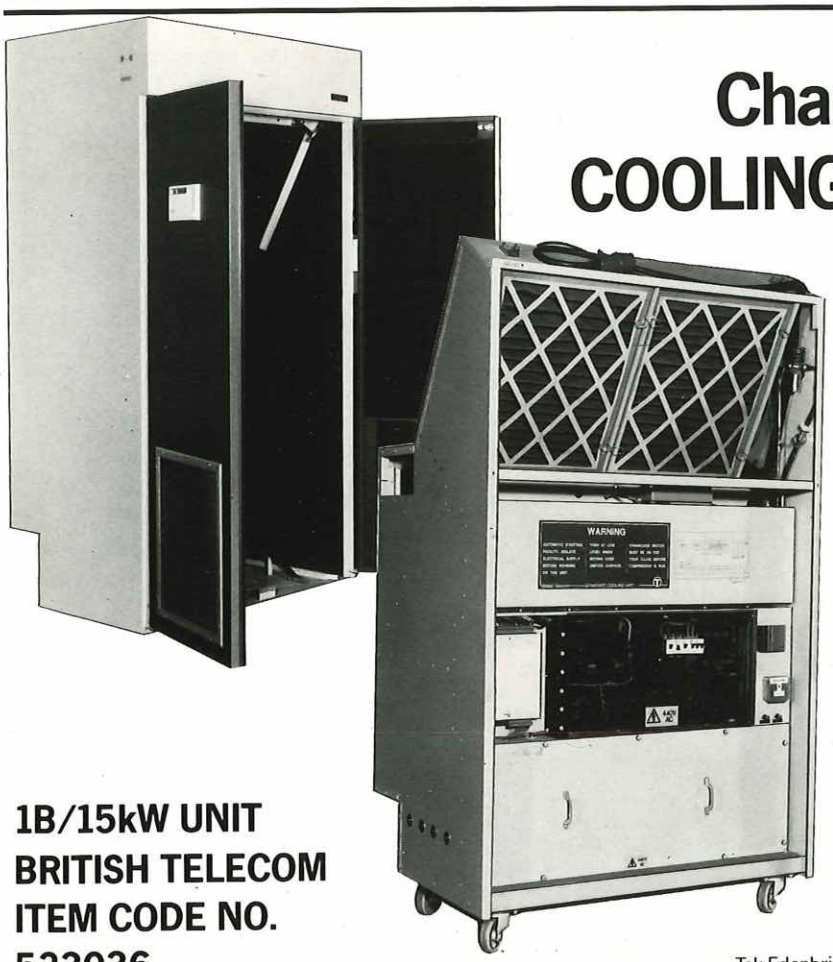
Other celebrities taking part in the half-hour Christmas package include Paul Daniels, Dennis Waterman and his wife Rula Lenska, Desmond Lynam and the speaking clock voice of British Telecom, Brian Cobby.

The programmes contain a mixture of music, quizzes, short stories and news. Already Max Bygraves, Ernie Wise, Des O'Connor, Glen Hoddle and George Cole have been interviewed and other star names are being lined up for the New Year.

Under the title 'Nice 'N Easy', the tapes are designed for relaxed listening.

Over – not out!

For those who think that mobile phones are something new, here is an eye-opener – a photo of the UK's first system on trial back in 1960. This photo of System 1 was discovered in the archives of British Telecom Mobile Communications. Pioneered by the Post Office, System 1 has been upgraded over the years to become today's System 4, still offered by BTMC as a low-cost regional mobile phone system. ■



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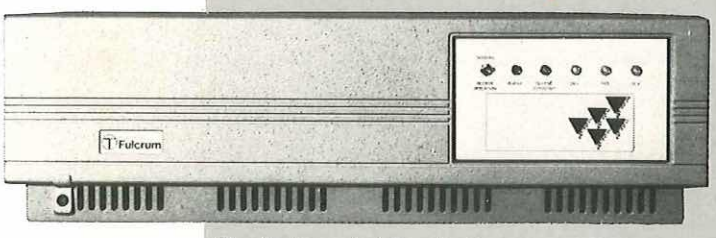

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The CEPTEL exchange based equipment consists of two parts, the Exchange Control Unit (ECU) and the Line Interface Shelf (LIS). The ECU allows full manipulation of the message and per line parameters for any of the 960 (maximum) local terminations. The recent extended facility of remote working over a dial up line allows the same manipulations to take place for an additional 1440 (maximum) lines remote from the ECU, located anywhere in multiple sites throughout the PSTN. Each LIS houses up to 80 terminations built up of sub-modules of 8 lines minimum. Each 16 line module (5 per shelf) is totally independent of the rest, with its own control and user-defined vocabulary.

Each module has an on-board battery to provide full memory support, in the event of 50V supply failure, for a minimum of four days.

The CEPTEL Studio Unit is a desk mounted, mains driven, additional system for the user to efficiently produce their own message vocabulary and structured announcements rapidly, using a microphone or tape input source.

A feature of the Studio Unit is the ability to retain the recognisable personality of the voice when digitised, useful for adding a local content to the announcement.

CEPTEL Features

- 2 or 3 wire exchange compatible.
- Comprehensive traffic analysis.
- Automatic self-diagnosis with alarm output and fault report.
- All lines monitorable (local and remote sites).
- Total non-blocking system — all calls answered with no waiting.
- Ongoing enhancement development.

LINE CONCENTRATOR 14/5A Mk. II

The Line Concentrator 14/5A Mk. II is a pair gain system consisting of two units, one housed in the telephone exchange and the other on a pole or in a cabinet.

14 subscribers' lines are concentrated by the exchange unit to four trunks (plus 1 for the data link/power feed). The other end of the trunks feeds a remote unit which distributes appropriately to the 14 subscribers.

A maximum of 4 subscribers at any time have access, hence low usage or low growth applications are ideal. A cost-effective alternative to cable is coupled with ease of recovery and reassignment. In some cases the 14/5A Mk. II may provide a permanent solution to expensive alternatives.

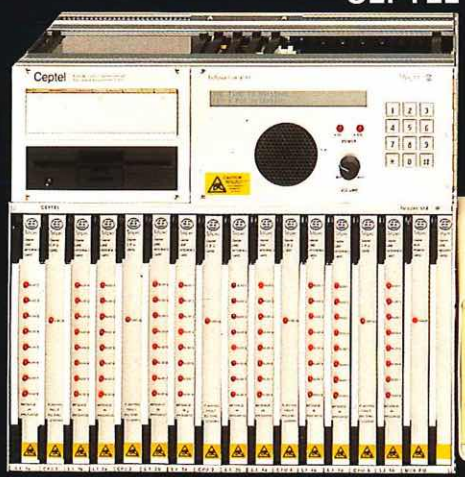
All connections from the exchange unit to subscriber are metallic.

This Mk. II system has been designed with considerable attention being given to high environmental reliability and maintenance of near standard line conditions.

Line Concentrator 14/5A Mk. II Features

- Reliable service in hostile environments.
- Quick clearance of customer waiting list.
- Cheaper alternative to cable.
- Constant dc line conditions to subscriber for memory 'phone support, etc.
- Busy tone supplied to subscriber going off-hook when unit has 4 trunks in use.
- Full compatability with the Mk. I units.
- Suitable for 2 or 3 wire exchanges.
- Remote unit available in either an economical sleeve 32A or a hermetically sealed metal box for pole or cabinet mounting.
- Comprehensive self-test capability.
- Ongoing enhancement development.

CEPTEL



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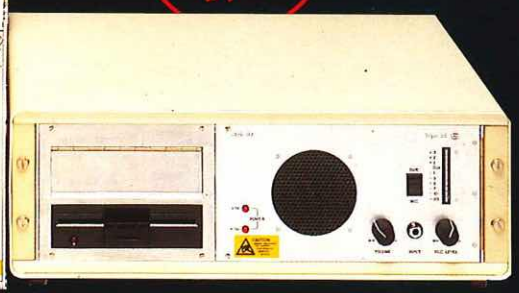

LINE CONCENTRATOR

For further details on either of these systems, or information on TELSPEC Ltd.'s other products, call or write to:

Kevin Hermanson (CEPTEL technical enquiries)
David Barrington (CONCENTRATOR technical enquiries)
David Earl (SALES enquiries)

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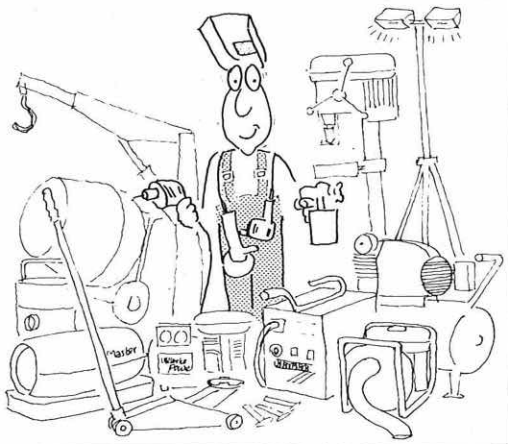

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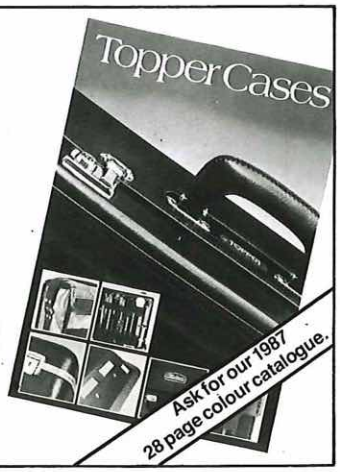

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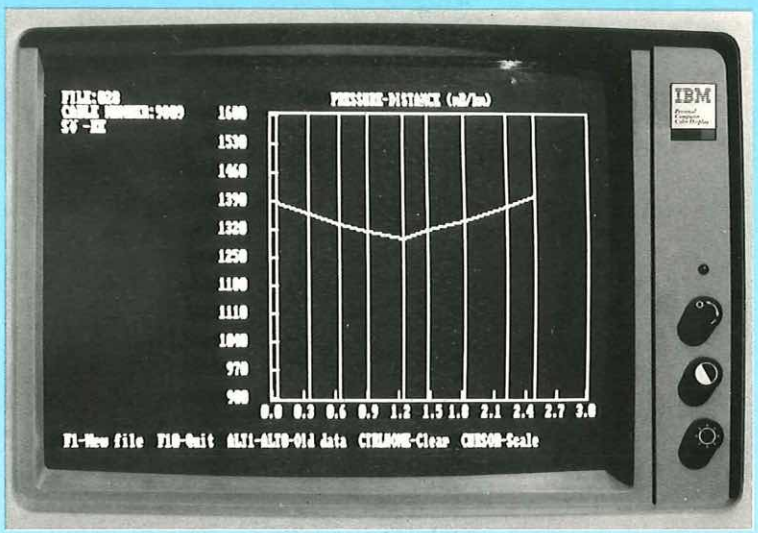

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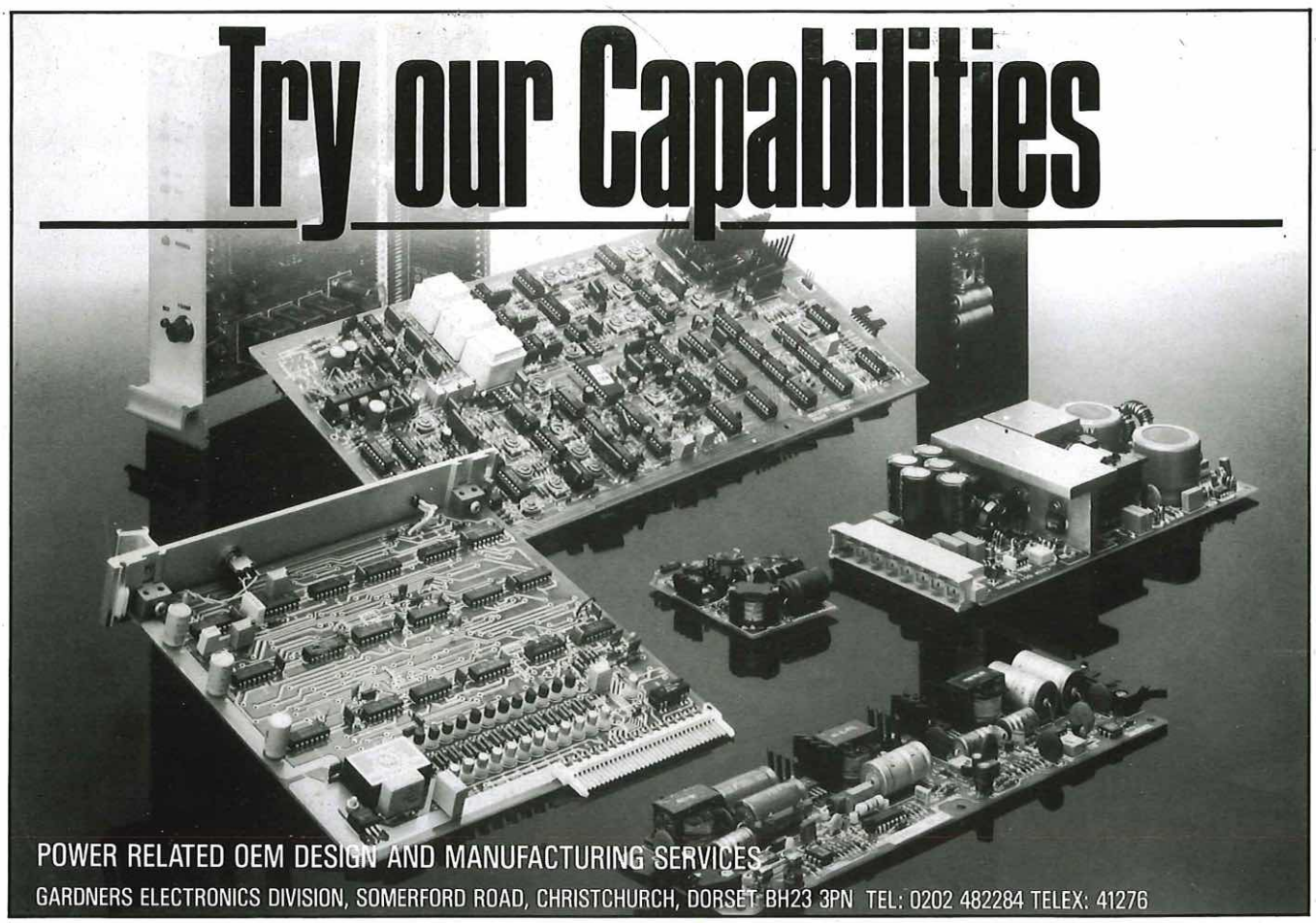
Advertisers index

Company	Page
Accuride	19
ADC	53
Anixter	80
AT & T Philips	62 & 63
AP Besson	29 & 76
BICC	51
BICC Vero	66
BT Fulcrum	76
Brook Street Bureau	11
Eaglehawk Electronics	74
Ebonestos	16
Edenaire	75
Ferranti	84
Fluke	10
Gardners Transformers	82
Gould Electronics	39
Hewlett Packard	23, 24 & 25
ICL	83
Krone	6
Landis & Gyr	52
Livingston Hire	34
3M	68 & 70
Machine Mart	80
NEI-DAC	74
NEK Cables	17
Newbridge Networks	20
Oakleigh Cases	74
Phoenix	46
Plessey	2
Plessey/GEC System X	30 & 31
Raychem	21
Rotadata	4
Smith Cases	77
Telspec	78
Teradyne	56 & 57
Topper Cases	80
Trend	45
Trend Datalink	5
Vaisala	81
Vanderhoff	40
Wandel & Goltermann	72



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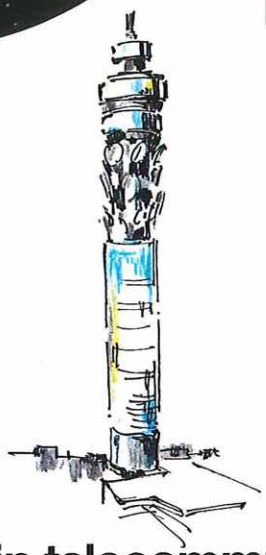

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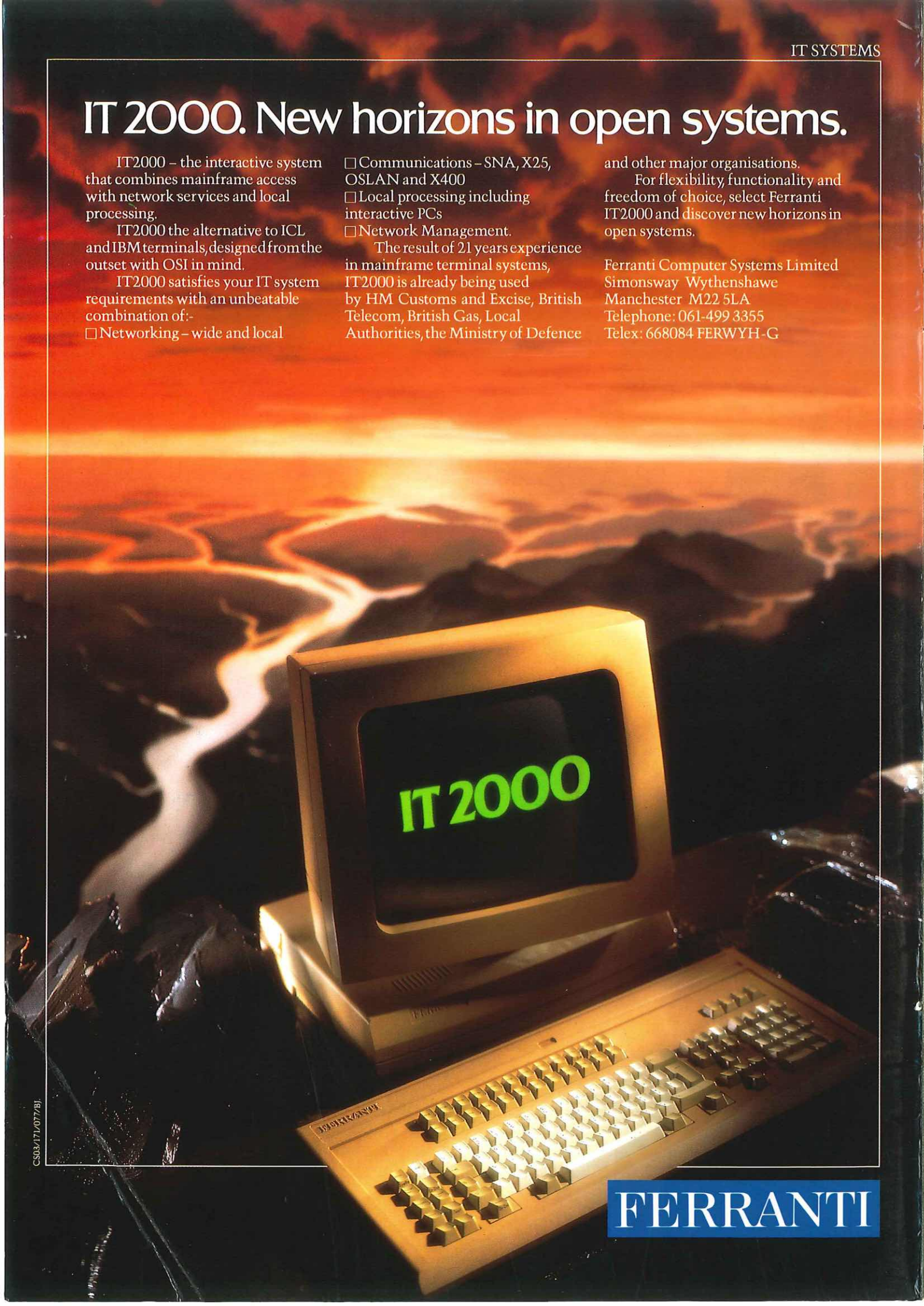

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